FAO, the Nexus and sustainable agriculture

By Lucie Pluschke, Water-Energy-Food Nexus Officer at FAO

3rd Task Force Meeting on the Water-Energy-Food-Ecosystems Nexus
27-29 April 2015 in Geneva
Time to reflect on what we have done so far on the Water-Energy-Food Nexus...

0 Engaged in **global discussions** at conferences, seminars and other events

0 Developed **concept note** and the beginnings of some **methodological approaches**

0 Worked with UNECE on the **transboundary Nexus assessments** in the Sava River and the Syr Darya

0 Collaborated with GIZ and the League of Arab States on **regional Nexus dialogue**

0 *In preparation, case studies and focused discussion on Nexus implications of a specific technology; or within a given geographic scope***
What emerged from this...

0 A Nexus assessment does not make sense anywhere and in any form and shape.

0 Thinking, talking and implementing the Nexus seems to make most sense when it comes to:
   • Resource use optimization at a technical/practical level;
   • Conflict resolution and dialogue at a political/higher level.

0 Focus on the *process* of thinking, talking and deciding on water, energy and food-related matters – in order to get to any meaningful results.
The Nexus in the bigger context
## Selected FAO Approaches and Frameworks

### Sectoral Approaches

<table>
<thead>
<tr>
<th>Crops</th>
<th>Livestock</th>
<th>Forestry</th>
<th>Fisheries</th>
<th>Aquaculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Save and Grow: Sustainable Crop Production Intensification</td>
<td>Global Agenda for Sustainable Livestock</td>
<td>Sustainable Forest Management (SFM)</td>
<td>Code of Conduct for Responsible Fisheries (CCRF)</td>
<td>Ecosystem Approach to Aquaculture (EAA)</td>
</tr>
</tbody>
</table>

### Cross-sectoral and Thematic Approaches

- Conservation and **Sustainable** Use of Biodiversity and Genetic Resources
- Energy-Smart Food for People and Climate (ESF)
- **Sustainable** diets
- **Resilient** livelihoods
- Climate Smart Agriculture (CSA) and FAO-Adapt
- Coping with water scarcity
- Global Soil Partnership (GSP)
- **Sustainable** Land Management (SLM)
- Landscape initiative (*in development*)
Synergies and Conflicts among Agricultural Sub-Sectors

Legend:
- Green arrow: Positive impact
- Red arrow: Negative impact
What is sustainable agriculture?
The conceptual framework
The Five Principles of Sustainable Agriculture
Building on ongoing initiatives

High Impact Opportunity on the Water-Energy-Food Nexus led by FAO and BMZ
- Regional policy dialogues
- Promotion of integrated food-energy systems
- Powering Energy in Agriculture Grand Challenge (USAID)

Regional Water Scarcity Initiative in the Near East and North Africa
- Strategic planning and policies
- Improving water management efficiency and productivity in major agricultural systems and in the food chain
- Managing the water supply through reuse and recycling of unconventional waters
# The Nexus in a specific context

Entry-point for analysis and discussions

<table>
<thead>
<tr>
<th>Topic</th>
<th>Nexus Dimension</th>
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<tbody>
<tr>
<td>Groundwater management</td>
<td>Overextraction of groundwater resources for irrigation, using diesel/electricity/solar-powered pumps</td>
</tr>
<tr>
<td>Irrigation modernization</td>
<td>Water and energy use efficiency vis-à-vis economic viability of large-scale irrigation systems</td>
</tr>
<tr>
<td>Intensification of livestock production</td>
<td>On-farm waste management for bioenergy production (“closed-loop”)</td>
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# The Nexus in a specific context

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<tr>
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<th>Nexus Indicators</th>
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<td><strong>Groundwater management</strong></td>
<td>Overextraction of groundwater resources for irrigation, using diesel/ electricity/ solar-powered pumps</td>
<td><strong>Context</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>Groundwater withdrawal</em></td>
</tr>
</tbody>
</table>
|                                      |                                                                                                                                                                                                                 |   - Renewable groundwater resources per capita  
|                                      |                                                                                                                                                                                                                 |   - Groundwater withdrawal rate  
|                                      |                                                                                                                                                                                                                 |   - Percentage of groundwater allocated to agriculture/ other uses  
|                                      |                                                                                                                                                                                                                 |   - Area under groundwater irrigation  
|                                      |                                                                                                                                                                                                                 |   - Number of groundwater structures for agriculture  
|                                      |                                                                                                                                                                                                                 | **Impacts**                                                                                                                                                                                                   |
|                                      |                                                                                                                                                                                                                 | *Change in groundwater levels and groundwater quality*                                                                                                                                                         |
|                                      |                                                                                                                                                                                                                 |   - Change in groundwater levels in both shallow and deep aquifers over time  
|                                      |                                                                                                                                                                                                                 |   - Change in salinity levels and selected water quality indicators over time  
| **Energy consumption**               |                                                                                                                                                                                                                 | **Energy pricing**                                                                                                                                                                                             |
|                                      |                                                                                                                                                                                                                 |   - Electricity subsidy ($/ha) of groundwater irrigated area and per consumer over time  
|                                      |                                                                                                                                                                                                                 |   - Capital, O&M and disposal costs for solar pumping system  
| **Importance of groundwater to**     |                                                                                                                                                                                                                 | **Importance of groundwater to agricultural production**                                                                                                                                                       |
| **agricultural production**          |                                                                                                                                                                                                                 |   - Contribution of groundwater irrigation to agricultural GDP compared to surface water  
|                                      |                                                                                                                                                                                                                 |   - Net agricultural profit after electricity subsidy (farm/ national level)  
|                                      |                                                                                                                                                                                                                 |   - Working hours saved due to access to irrigation/ cost of operating pumps  
|                                      |                                                                                                                                                                                                                 | **Greenhouse gas emissions**                                                                                                                                                                                    |
|                                      |                                                                                                                                                                                                                 |   - GHG emissions from groundwater pumping for irrigation (electric/ diesel pumps, MtCO2e)  

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In conclusion...

0 Integrate Nexus thinking in broader processes about sustainable development and natural resources management

0 Focused interventions on specific technological, managerial or operational issue
   ▪ Development of case studies