Managing Water Risks For Agriculture:
a Discussion with the Private Sector

Summary of the Workshop
MANAGING WATER RISKS FOR AGRICULTURE
A DISCUSSION WITH THE PRIVATE SECTOR

Summary of the workshop

Responding to water risks for agriculture

Agriculture faces increasing water challenges, ranging from climate change, increasing water competition from other sectors, and gradual water quality deteriorations. At the same time, agriculture is a major user and significant polluter of water. Agriculture accounts for approximately seventy percent of total water use, and is often an inefficient user; agriculture irrigation largely contributes to groundwater depletion and its associated consequences; and excessive use of nutrients and pesticides are key sources of water pollution in many regions.

As a response to these challenges, policy makers should aim their efforts to increase the overall efficiency of water use, reduce impact of the sector on freshwater resources, and improve the resilience of the sector to water risks. Over the past ten years or so, the OECD has been developing solutions to achieve these objectives. Most recently, the OECD is exploring means to increase the resilience of the agriculture sector to water risks, by employing an approach that focuses on localized identified productive agricultural regions facing the most critical water risks, defined as water risk hotspots for agriculture.

Private companies and non-profit organisations have been very active in the area of agriculture water risk management, often operating earlier and faster than governments, and using targeted initiatives that aimed to reduce local agricultural risks. To understand the actions that these actors have taken, their effectiveness and the role of the government in addressing these challenges, the OECD, in partnership with the Dutch Ministry of Economic Affairs, organized a workshop on water risk management in the private sector on November 9 2016, at the OECD Conference Centre, in Paris. Participants included delegates from the OECD Joint Working Party on Agriculture and the Environment and representatives of the private sector and associated non-profit organisations.

The workshop served as a forum to discuss and advance solutions to improve the management of agricultural water risks. It discussed the importance of information on water risks, the approaches used by the private sector to manage water risks in agriculture production, and what role governments should have to advance lasting solutions in the future. This summary reports the key findings from the workshop along these three dimensions (that also formed the basis of the three workshop sessions).

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1 This summary reflects the outcome of the workshop and does not necessarily represent the views of the Ministry of Economic Affairs of the Netherlands, that of the OECD, or of its member countries. It was drafted by Assia Elgouacem and Guillaume Gruère.
1. Agriculture water risk information: status and role in management

The objective of this session was to discuss how the agro-food sector measures water risks, the types of risks that are assessed, the data and methods used for their assessment, and the limitations that exist. It also discussed the disclosure of water risks by companies.

What risk information is available?

The session chair (OECD) identified four main water risks to guide the discussion of the water risk information. These risks are scarcity, flooding, pollution, and the risks undermining the resilience of water systems.

The World Resources Institute (WRI) presented its well-known Aqueduct tool to assess global water scarcity risks, which is used by companies, non-profit organisations and other actors. The main risk indicator used in Aqueduct is “water stress”, defined as the ratio of total water demand to water supply. The indicator has been applied at the watershed scale, globally, based on historical and simulated data and is available as an interactive tool for internet based users (Figure 1). It is then used in combination with irrigation data to focus on agriculture.

Figure 1. Baseline Water Stress, WRI AQUEDUCT Project

Source: Presentation by R/ Hofste, WRI.  http://www.oecd.org/tad/events/Session%201%20Hofste.pdf

Results of the WRI Aqueduct show in particular, that more than 50% of areas used for agriculture experience high levels of water stress. Water stress levels will continue to increase especially in the Middle East and North Africa (MENA) region, Eastern Europe and Central Asia. Socioeconomic factors and more specifically demographic changes will play a bigger role in influencing future water stress relative to climate change.
In the discussion that followed, several participants insisted the synergy between socioeconomic pathways and climate change that cannot be neglected in the projections on water stress. While WRI Aqueduct provides a global picture of water stress, there are other (regional) sources of water risks which are not represented. In particular, WRI will soon launch a new dataset mapping flood risks, as an additional indicator.

**Are agro-food companies assessing risks?**

CDP and Ceres collect and publicize data on corporate water risks, by reviewing the efforts undertaken by the private sector in assessing exposure to water risks. Disclosure can be a transformative process and thus incentivize corporate action through data collection; by publicizing data, they aim at influencing the allocation of financial capital and responses to risk. CDP collects a gamut of indicators related to risk: from evidence of risk assessment to facilities at risk, the financial value of risk, and its impact, among many others. Through its 2015 initiative “Feeding Ourselves Thirsty”, Ceres evaluated companies across the US agricultural sector on how they responded to water risks.

Results show that a limited number of companies effectively assess water risks. While consumer staples sector is exposed to the highest risk, CDP finds that half of the surveyed companies in this sector are not taking comprehensive water risk assessments. Ceres finds that while companies in the agro-food industry in the United States take into account direct operational water risk, two-third of the 37 companies it surveyed in 2015 did not consider water risks in their supply chain.

Companies that do assess water risk rely on internal data and methods, but may also rely on outside expertise. At the international level, WRI Aqueduct has been in high demand from the private sector and it is predominantly used to design long term water strategies for industries (e.g. agro, oil and gas, and manufacturing). The applicability of the results from the Aqueduct tool depends on the level of knowledge the private sector has regarding where they source their material. In this regards, companies differ greatly; while for some companies, knowledge of their sourcing regions is very local, for others it is at a national level.

**How to move forward on better and broader risk assessment?**

There is still a need for robust, high quality data on several types of water risk For instance, despite its growing importance as an important buffer to surface water volatility, groundwater remains a relatively invisible resource. Several participants echoed the importance of understanding the stock and evolution of groundwater resources. WRI is moving forward on developing a dataset on groundwater to complete the picture on the quantity of water. Notwithstanding water quantity risk assessment, water quality must also be taken into account in a broader risk assessment.

Moving forward on water risk information would require shifting from understanding water risk assessment processes to using water risk targets. The problem that arises when setting targets for water risk is that there is no simple methodology for doing so. This shortcoming is mainly due to water being a local issue. Another challenge is to develop a common language among the various stakeholders on what the water risks are. Collaboration with the scientific community is suggested as one way to overcome this limitation.

Furthermore, modelling and mapping risk is useful, but that there is still a need for a long-term strategy grounded in localized practices. Water stewardship is a complex journey since water is very local. Ceres’ AgWater Challenge aims to develop robust commitments to reducing supply chain risk and sets out a framework to identify where companies are in their stewardship journey.
2. Private actions to manage water risks for agriculture

This session discussed means, drivers and successes in managing water risks for agriculture. As introduction, the session chair (OECD) presented an intuitive economic framework to understand the incentives of farmers for mitigating water risk. Such a model tries to understand how, given a farmer’s expectations of the possible future water-related damages, the farmer responds to future water risks. In the simplest version of this model, the farmer is capital constrained and is subject to exogenous risk. Risk is then endogenised such that the other farmers’ behaviour matters. Adding on firms, which use farmers’ output as intermediate goods, the model can then assess which factors motivate firms to minimize their exposure to risk (e.g., by changing ingredients, moving out of a region or working with farmers). A problem of coordination emerges between companies and farms, because if companies act before farmers, there will be no incentive for farmers to take action (and conversely if farmers act first). The results are also driven by whether uncertainty is considered exogenous or endogenous to farmers’ actions.

Key conditions for success

Drawing on a discussion note on approaches to water risk management prepared by Wageningen Economic Research by Ebbens Wateradvies & Projecten2 presented several examples of successful water risk management in the agro-food industry. It noted that optimizing water demand and supply management is not sufficient; and a regional catchment area based approach is necessary for mitigating water risk. Panellists emphasized that technological efficiency might not take into account problems at the catchment level, because there is limited scope for technical solutions to improve catchment levels. For example, improving irrigation efficiency can be a way to managing flows and volume, but it is not a silver bullet solution which can be applied everywhere. A more sustainable approach would consist in understanding the context and starting at the catchment level. As noted by WWF maintaining water quality is also critically important for sustainable water dependent ecosystems.

Representatives from agro-food companies discussed their approaches to water stewardship. For Nestlé, stewardship is grounded in the idea that innovation is not just about technologies but rather is a mind-set. Sustainable water resource management centres on collaboration at the river basin or catchment level. Despite the company’s efforts to invest in the efficiency of water use and to decrease water dependency at the farm level, operational and reputational issues remain. Water risks, then, must be tackled in collaboration with the public sector. This approach is exemplified by a public-private partnership (PPP) initiative that Nestlé launched in Columbia called Manos al Agua, a multi-sector collaboration in coffee production together with local and international public engagement. It encourages an integrated water management approach with touches upon efficient water use, domestic consumption, forest management, monitoring stations, and innovation crops among others. They would like to make this initiative replicable and scalable.

PepsiCo echoed Nestlé’s insistence that the success of water risk management hinges on public-private partnerships. The company sources its material (ranging over several crops) from different parts of the world and from partners with whom it has forged long term relationships. Therefore, the company faces water risks that are very local in nature and demand a holistic approach predicated on sustainability; its strategy is laid out in a framework called “Performance with Purpose”. The approach looks to impact nutrition, reduce the company’s water footprint, to target and improve water efficiency on the ground and provide resilience to communities. The farm environment targeted by such an approach should also complement efforts to other address other issues such as pollution, and climate change.

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2 Available at: [http://www.oecd.org/tad/events/Approaches%20to%20water%20risk%20management_OECD2016_2.pdf](http://www.oecd.org/tad/events/Approaches%20to%20water%20risk%20management_OECD2016_2.pdf)
A collective discussion among the different parties involved is needed to ensure the success of localized risk mitigation solutions. Working at the catchment level necessitates negotiated allocations between communities and the city, between consumptive use of water and non-consumptive use of water, and between upstream and downstream sectors. 2030 Water Resources Group stressed the importance of appropriate scale and underlined the lack of ownership of the water-agriculture nexus as well as the lack of outreach from governments to the private sector. It convenes the public sector, private sector, and civil society at the global and country level to engage into action towards lowering supply-demand water gaps. Its objective is to create partnerships at the country level by bringing in key stakeholders towards a common objective. A major challenge for the private sector is indeed the scaling up of projects. Capital investment and government involvement are identified as two key conditions which ensure successful scaling up of water risk mitigation.

Technical solutions also have a significant role to play. Salt Farm Texel provided an example of how technical innovation can address salinity related risks. The farm is set on an island in the Netherlands that is cut off from freshwater resources. The farm has thus been confronted with the challenge of water scarcity and salinization, compelling it to resort to breeding new salt tolerant varieties. Its success in yielding crops with brackish or seawater testifies to the importance of knowledge generation in addressing water risks. The farm currently serves as a laboratory and provides training around the world to farms constrained with salinity issues or willing to explore the potential of seawater based irrigation.

Overall, water management was seen by a participant as the most difficult issue for farmers, given issues of variability, dynamics of stocks and flows, quality, and other hard to track variables. He called for harnessing the available knowledge base, encouraging companies and governments to work with universities to have training programs that can close the agronomy knowledge gap.

Remaining uncertainties

There was a clear consensus from the discussions that partnerships and collaborations are necessary conditions to successful water risk management approaches. These partnerships, however, are difficult to implement and necessitate a
leader who can initiate and facilitate the process. Many participants pointed to the government for leadership in forging partnerships to address water risks, but this role does not have to be entirely reserved to public authorities. WWF argued that other stakeholders could take the lead depending on the nature of the project. For instance, WWF developed a local partnership project in Lahore and the wider Punjab province in India, and they ended up taking the role of the convener of the different parties involved in the project. In other cases, such as in their work with Marks and Spencer, WWF South Africa led the co-ordination but a local NGO was one of the key implementers.

In order to establish a robust base for collective action, it is important to understand the functioning of the ecosystem in which this action would be carried out. 2030 WRG explained that the configuration of the agro-water nexus in the public sector often stands as an obstacle when dealing with water risks. Agriculture ministries and water ministries tend to be separate bodies, where the former deals with a multitude of issues such as pricing and land use that take precedence over water, and the latter deals with supply-side issues from an engineering perspective. Therefore on either side, the agro-water nexus is not a priority and in the end no one takes ownership of issues specific to it. To remedy the disconnect of water authorities from agricultural authorities, a participant suggested that the agriculture ministries should integrate water issues and not the other way around. In Australia, water and agriculture are now managed by the same ministry.

Possible limitations

Water stewardship is not a universally accepted concept on what is to be done at the farm level or basin level, or at the global level. It is a new discipline that has been growing for the past 15 years and thus it is still finding its way. There is, nevertheless, a noticeable rapid uptake of water stewardship by a limited number of leading private companies since they are increasingly subjected to water risks. Overall, companies are doing better than they used to, but only few are doing much better and many need to get up to scale. The capacity to finance the expansion of water risk management projects is thwarted by a lack of involvement from the financial sector. Despite the large demand for finance, agricultural and water sectors have yet to manage to attract enough capital investment. The scale of effort needed to properly tackle water risks is beyond any one corporation, hence the crucial role of the government in providing leadership and supporting capital investments.

Water risk management had thus far been discussed in terms of holistic approaches focusing on optimizing water use to sustain certain activities, but it remained unclear whether part of the solution could be to adjust farming systems. For agro-food sector representatives, the long last relationships they forged with their sourcing partners are not easy to rupture since the livelihoods of the local communities depend on them; these links ensure income for farmers. These same relationships are also persistent because the farms have been successful. Therefore the goal is to build on these successes and change can disrupt the value the business model created. At the same time it is recognized that some crops are not fit in a given region and this scenario calls for a rationalization project. Nevertheless, there remains a political dimension for industrialization of areas (e.g. entrenched location of processing or manufacturing companies) that can limit the extent to which farming systems can be adjusted.

The discussion also highlighted that agricultural water stewardship can be more difficult to implement in a developed world setting than in a developing country context. When it comes to water risk, the difference between developing and developed countries is the focus on different types of risk. For the former, the focus is mostly pertaining to water quantity, and for the latter the focus lies on risk pertaining to water quality which may involve the difficult issue of diffuse pollution control. Developing countries are often at the start-up phase in their water stewardship journey and are deemed easier to work with than developed countries with more established institutions that can help but also sometimes hamper progress. Water risk management in developed countries is often centred on best practices and policies and despite the sophistication of equipment, water risks are still poorly managed in many parts of the developed world.
3. What role for governments?

Building on the two previous sessions, this session discussed the role of governments in identifying and managing water risks in the agro-food sector.

Figure 3. Four types of policy instruments

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<th>Level of state involvement</th>
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<th>High</th>
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<td>1. Information instruments</td>
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<td>2. Economic instruments</td>
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<td>3. Legal instruments</td>
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<td>4. Miscellaneous</td>
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- Awareness raising
- Knowledge transfer
- Best practice
- PPP ‘Golden triangle’
- Support and facilitation
- Tariffs and charges
- Subsidies
- Water markets
- Standards
- Permits
- Rules
- Command and control

Source: Presentation by M. van der Heide, S. Reinhard and E. Ebbens, Wageningen University and Research and Ebbens Wateradvies & Projecten. [http://www.oecd.org/tad/events/Session%203%20VanDerHeide.pdf](http://www.oecd.org/tad/events/Session%203%20VanDerHeide.pdf)

Overall importance of policy to govern and regulate agricultural water use

A presentation from a participant from Wageningen Economic Research based on the aforementioned discussion note enumerated the set of instruments available for the regulator of the agro-food industry and ranks them by their level of state involvement: information instruments requiring the lowest level of involvement, followed by economic instruments, and legal instruments, which demand the highest level. Economic instruments are generally regarded as more efficient than legislation, but information is identified as the most powerful instrument. Knowledge sharing, among information instruments, is singled out as one of the essential keys to effective water risk management and became a focal point of this session.

A researcher from Cambridge University then provided an academic standpoint on the concept of governance and what it entails for water risk management. Government is endowed with a broad perspective, thus it is in the position to set up a policy framework in accordance with its national goals. The role of the government is then to regulate and monitor and the role of the private sector is to follow the rules. This point did not go uncontested by other participants who advocate for the involvement of the private sector in shaping regulation. Since water stewardship focuses on the users of the resource, they should be part of shaping the governance of the resource. What was clear from the deliberation is that the private sector can be involved in regulating water resources solely at the local level. Since water risk management is a long term endeavour, short term political cycles can thwart its success. While companies may face short run shareholder objectives, they generally benefit from political stability and policy continuity when setting out their water risk management strategies.

The role of information as an instrument for regulation was discussed further in the context of standard setting. The Alliance for Water Stewardship (AWS) specified that public regulation takes the minimum level of requirements to set a standard, whereas private standards can supersede the minimum level and complement existing regulations. AWS is a global collaboration platform to promote responsible freshwater use by stressing on both a collaborative and catchment
based approaches to water and there are many initiatives that use the AWS standard. A few examples such as a subset of coffee farmers in Colombia, or Edeka, one of the largest German supermarkets, use AWS standard. Edeka also requires its suppliers to be AWS certified. Thus, AWS is not merely a labelling scheme but a standard to address the problem of communicating effectively to consumers about good water stewardship.

Governments lag behind the private sector in their commitment to sustainability including tackling water risks. This asynchrony could be attributed to the multiple layers of local government that hinder and slow down national policy change. For AWS, knowledge generation starts at the catchment level and then it is brought up to the national and global level. To accomplish this task and because economic policy is not necessarily aligned with water resource management, there needs to be policy coordination. In this regard, the most important element of government can be the local catchment authority. Allocation rights to the basin require negotiations which also call for local authorities to mediate and regulate the process.

**What should governments do?**

Based on his experience in water stewardship for a large food company, one of the panellists identified three key roles for the public sector to water risk mitigation: 1) to secure the potential for replication, scaling up, and the implementation of a project across different time horizons and across partners; 2) to reduce the transaction cost of collaborating with local stakeholders; 3) to act as an insurer by knowing what the state of resources is, understanding the water risks as well the uncertainties in the context of climate change. These roles are not to be limited to the public sector only. There is flexibility is the uptake of responsibility by the private sector and civil society. Both Nestlé and PepsiCo discussed the importance of working with public authorities in ensuring the scalability of their efforts.

In this vein, governments were called by private companies to reach out to enablers, initiators, and facilitators to bring about a comprehensive solution. Leading companies believe that they have improved their management of agriculture water risks in the past ten years or so, but they now face limits that will require further involvement of other actors. Since the private sector finds itself at the intersection of water and agricultural authorities, the public sector can tackle this issue by providing a framework to allow for flexible responses and to share innovation related to water risk management. One participant called the communication and policy challenges even more severe than the hydrological ones.

Much of the discussion then focused on knowledge sharing. Competition can hamper knowledge sharing among companies, as they would want to protect their comparative advantage. Therefore, additional effort should be taken to ensure that the public and private sector are motivated by the same goal. Private sector participants expressed their willingness to contribute to the knowledge base (in the pre-competitive phase) and pointed out that at the watershed level, there is common interest in knowledge sharing. Additionally, when collaboration is vertical, there are no conflicts of interest. The scientific community can also be involved in alleviating knowledge gaps and providing rigor for target setting. Still, there was a difference among participants in needs and approaches to knowledge development. According to 2030 WRG the lack of knowledge as such is not the issue – with the exception maybe at local the level – but rather the question of who is driving the process, the enabling environment and how to ensure proper funding. Also, the local nature of water risk prevents replication at the risk of being unethical. Another participant, however, insisted that the common denominator among stakeholders is the need to gather and share information. Small and medium enterprises are even worse off as they do not have the knowledge that big corporations possess, therefore they should to be taken into account. The government can play a role in disclosing information on water use and facilitating information sharing at the local level, especially since this is not a costly undertaking.
Key takeaways from the workshop

- Participants emphasized that information on water risk is crucial; they called for efforts to harness the existing knowledge base, to generate better information and to share it. There is a pressing need for better data on groundwater resources and water quality risks. The local nature of water risk renders replication of best practices and target setting difficult, as there is no common methodology for setting rules of action. It will be instrumental to establish shared risk assessment indicators and solution methods. The scientific community can thus take up the challenge and bring rigor to water risk assessment.

- Past experience discussed at the workshop demonstrate that the success of managing water risk lies in public-private partnership at the local (catchment) level, involving multi-stakeholder engagement. The local nature of water risk should be addressed with localized solutions, and the public good aspect of water demands collaboration. Because of these two specificities, responses to water risk ought to be holistic and contextualized.

- At the same time, successful partnerships and collaborations, such as those presented, are not simple to implement. They require leaders who take initiative, convene relevant stakeholders, and facilitate the project. The public sector, in addition to setting regulation, has an important role in bringing the stakeholders together; however, leadership in projects does not have to be limited to the local public authorities. The public sector is also implicated in the scaling up of projects, as it can be helpful in shoring up the necessary financial support.

- Participants noted the critical importance of setting up more general public-private partnerships for successfully managing water risks, acknowledging that the ‘distance’ between the private and public sector is not the only gap that needs to be bridged. Cooperation is also needed between: scientists and local stakeholders, different government bodies and levels, water experts, agricultural experts, financial experts, or within the private sector.

- The private sector increasingly takes a pro-active role in managing water risks, driven by the growing awareness of the issues at stake, potential damage to reputation and increased scrutiny from financial investors. However, moving beyond current efforts by the private sector will require government involvement. Active agro-food companies are ever more energized to address water risk mitigation, but would need governments to help coordinate and complement their efforts to advance on sustainable water risk management. At the same time, government policies, including economic instruments (water pricing, taxes), could help incentivize response to water risks for the large share of companies that have yet to assess their water risks.

- Participants called on the OECD to support the private and public sector in finding the right pathways to make the necessary changes happen.

For more information

The following site includes the agenda, a discussion note and the presentations:

OECD’s work on agriculture and water: