DIMENSION 1: WATER USE FOR RURAL WASH (FOCUS DRINKING WATER SUPPLY)

The ambition is to improve **Water Security for All.** We use the following definition of water security:

- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

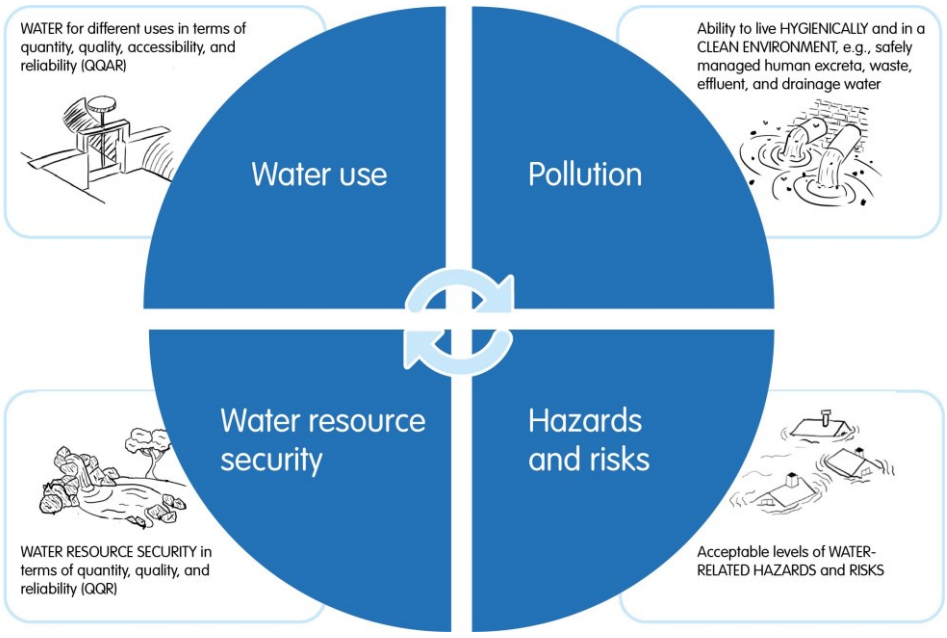
Water security has 4 dimensions (see figure). Your group will explore the first dimension of water security, namely: the quantity, quality, availability, and reliability (QQAR) of access to water supply at point of use. Your metric should be expressed in numbers of people with access.

JMP already provides a measurement standard of safely managed drinking water, the question is whether you would change or modify something to include the aspect of climate resilience better.

You could consider the following of current measurement practice:

- Quantity of water. Although most countries have national standards for the volume of water per capita, these are used for design not for monitoring of access. Also JMP does not monitor the quantity of water that households use.
- Quality of water, this is part of the JMP standard for safely managed water supply, but in rural context water quality testing is rarely feasible at scale.
- Accessibility of water is measured with JMP, namely duration of a round trip of water collection and connection on the premise.
- Reliability is not measured in JMP, though there are examples of measuring downtime and number of hours with water per day.

Rural households may be using multiple water sources. Currently measurement of water access tends to consider only the "primary water source". There could be arguments to include secondary water sources if we want to have better insight into climate resilience.



DIMENSION 2: LIVING IN A CLEAN ENVIRONMENT FOR RURAL WASH (FOCUS SANITATION, HYGIENE, SOLID WASTE)

The ambition is to improve **Water Security for All.** We use the following definition of water security:

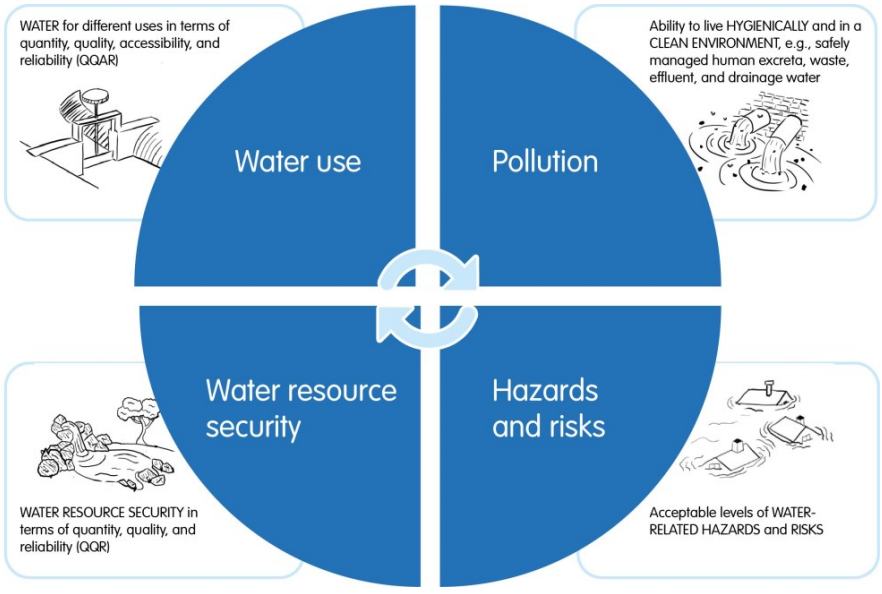
- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the second dimension of water security, namely: being able to live hygienically and free from pollution, e.g., from human waste, waste water, solid waste. For rural households this entails access to sanitation, solid waste management, and key hygiene behaviours. It could potentially also include grey water management at household level. Your metric should be expressed in numbers of people with access.

JMP already provides a measurement standard for sanitation and hygiene in rural WASH, the suggestion is to start from that practice, and then consider whether we would change or add something in that to include all kinds of waste and/or to include the aspect of climate resilience better. Note that water resource security and its water quality are measured in dimension 3.

You could consider the following of current measurement practice:

- Based on toilet types: sanitation aims to separate human faeces from human contact. Effective separation is called “improved”. We use “toilet types” as a proxy to determine whether sanitation is “improved”, but toilets are far from standard.
- No information on ground water contamination by toilets.
- Sludge management of on-site sanitation is a development area.
- Measurement includes observation as to whether the toilet is in use, not use by all.
- Hand washing with soap measured through a proxy.
- No current global standard for solid waste management at the household level.



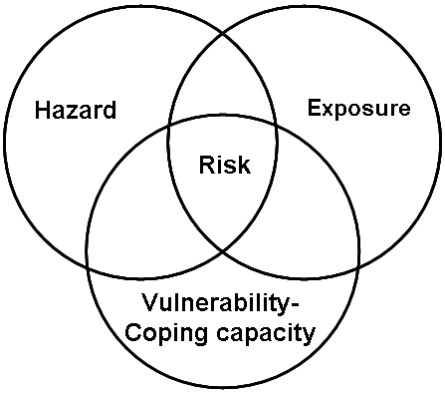
DIMENSION 3: WATER-RELATED HAZARDS AND RISK FOR PEOPLE IN RURAL WASH

The ambition is to improve **Water Security for All.** We use the following definition of water security:

- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the third dimension of water security, namely: 3) an acceptable level of water-related hazards and risks, namely floods, severe storms and drought. Your metric should be expressed in numbers of people with an acceptable level of risk.

Unlike the JMP guidance for water, sanitation and hygiene access, there are no standardised measurements for flood, storm and drought risk in rural WASH.

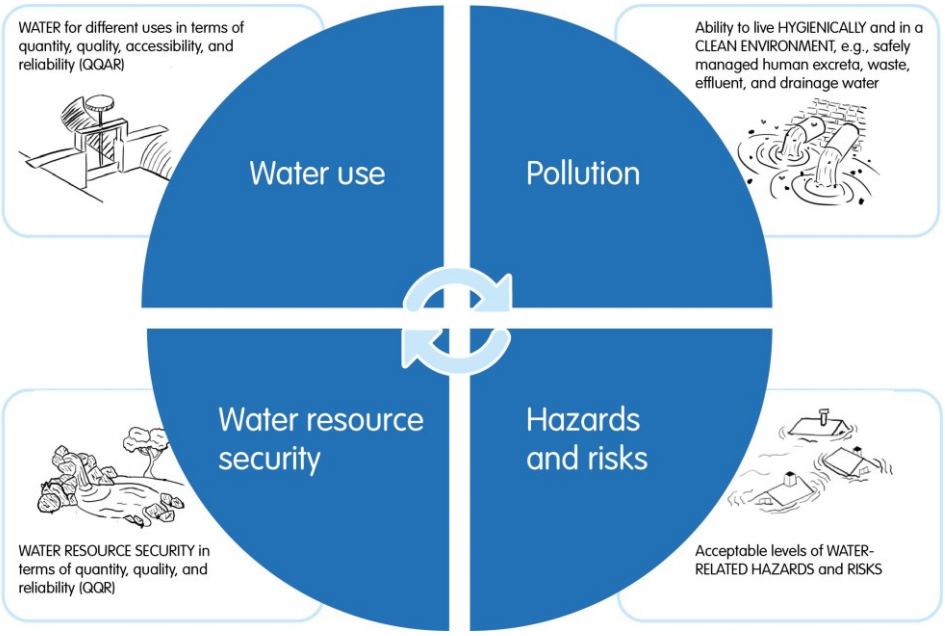


Note this is not just the risk for their WASH facilities but for their livelihood as a whole, it may include for example:

- Health impacts (injuries, disease, loss of life, mental health issues)
- Evacuation (planned/ unplanned) or prolonged displacement
- Inaccessibility and/or damage to WASH facilities
- Damage to house, crop, livestock, means of transport
- Loss of income or job

When we measure risk, we need to consider that this is a combination of the hazard, the exposure to the hazard and the vulnerability. To reduce the level of risk, efforts focus on reducing exposure and vulnerability, because hazards (storm, flood or drought event) are beyond our control.

Yet we do not just want to see whether measures to reduce exposure and vulnerability are in place. Ideally we also want to know whether the risk and damage are reduced. This is a small puzzle for you!



DIMENSION 4: WATER RESOURCE SECURITY FOR RURAL WASH (FOCUS ONLY ON THE SOURCES)

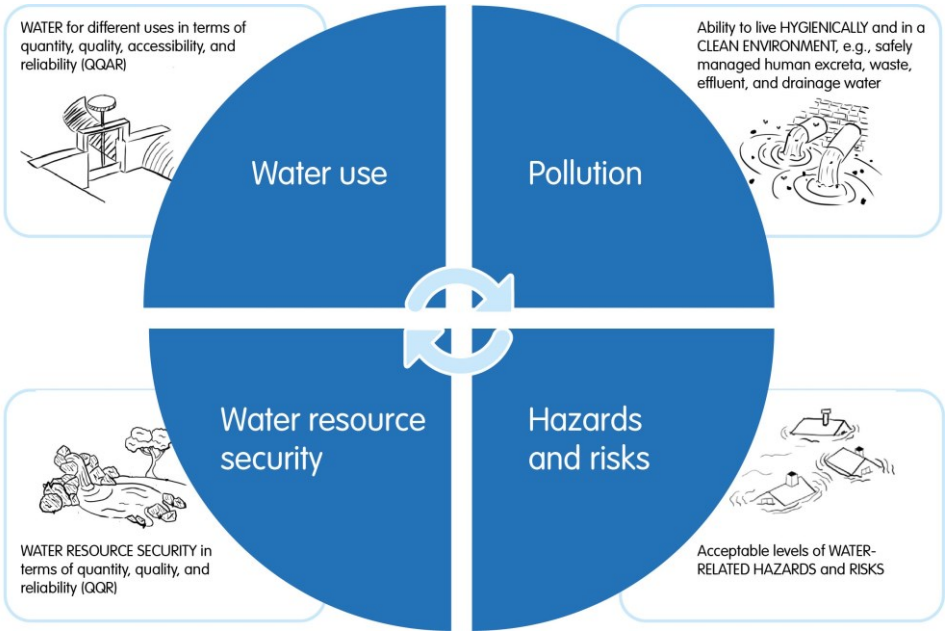
The ambition is to improve **Water Security for All.** We use the following definition of water security:

- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the fourth dimension of water security, namely: 4) have water resource security in terms of quantity, quality, reliability (QQR). For rural WASH, this links essentially to the sustainability and sanitary management of the source (being ground water or surface water). Your metric should be expressed in numbers of people who rely on the water source(s).

Unlike the JMP guidance for water, sanitation and hygiene access, there are no standardised measurements for the quality, quantity and reliability of the water source in WASH. However, we are not at zero either, see also below. Note that ideally we would want to measure the state of the resource today, not just a proxy like having protective measures in place like in water safety planning.

Quantity	*Water source provides sufficient water for all agreed (licensed or other) raw water intake AND Total volume of raw water intake by all major sectors does not jeopardise the environmental requirements of the waterbody (causing it to deplete) (see "water stress[1]")*
Quality	*Water source with good ambient water quality[2]*
Reliability	*Natural fluctuations in the water resource are not significantly altered[3] meaning permanent flow becoming seasonal, or reduced discharge (threshold based on river specific flow duration curves for example).*



[1] SDG indicator 6.4.2 "Level of water stress: freshwater withdrawal as a proportion of available freshwater resources"
[2] SDG indicator 6.3.2 "Proportion of bodies of water with good ambient water quality", including 5 parameters: oxygen (surface water); salinity (surface water and groundwater); nitrogen (surface water and groundwater); phosphorus (surface water) ; acidification (surface water and groundwater). https://www.unwater.org/our-work/integrated-monitoring-initiative-sdg-6/indicator-632-proportion-bodies-water-good-ambient
[3] See also https://www.sdg661.app/productsmethods

DIMENSION 1: WATER USE FOR IRRIGATION

The ambition is to improve **Water Security for All.** We use the following definition of water security:

- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

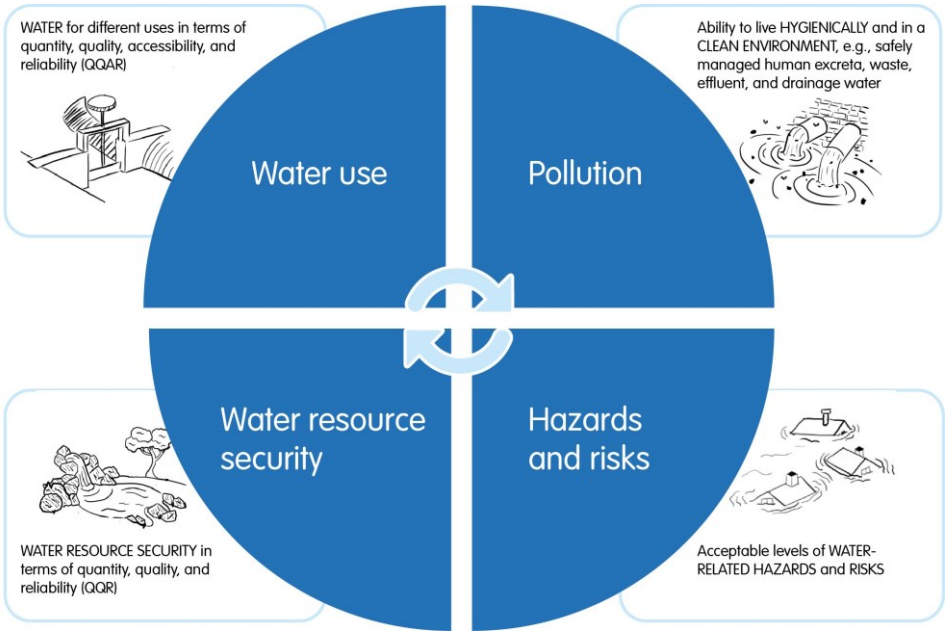
Water security has 4 dimensions (see figure). Your group will explore the first dimension of water security, namely: the quantity, quality, availability, and reliability (QQAR) of access to irrigation water at point of use (the irrigated plot). Your metric should be expressed in numbers of people with access.

Quantity, quality, availability and reliability of water access is the responsibility of irrigation management, but metrics in irrigation tend to focus on productivity, number of hectares with a technology (e.g. drip irrigation) and of course farmer income.

Please try to explore the following:

- Quantity of water for irrigation, this could be compared to the agreed planting schedule in the system, or to the crop water requirements.
- Quality of water, this could consider crop requirements, but also the salinity of the irrigation water or other elements affecting the soil, possible of pollutants in the irrigation water, turbidity, solid waste. It could be measured in the water or – perhaps easier- whether it affects the soil/ plants. Irrigation with waste water would be a special case here…
- Accessibility of water should look at the way it arrives and the effort the farmer needs to do to get it to the field.
- Reliability is measured considering the agreed turns (in case of collective, surface systems) or the reliability of the pumps (in the case of individual pumping).

Note that water draining from irrigation fields is addressed under dimension 2.



DIMENSION 2: POLLUTION BY IRRIGATION

The ambition is to improve **Water Security for All.** We use the following definition of water security:

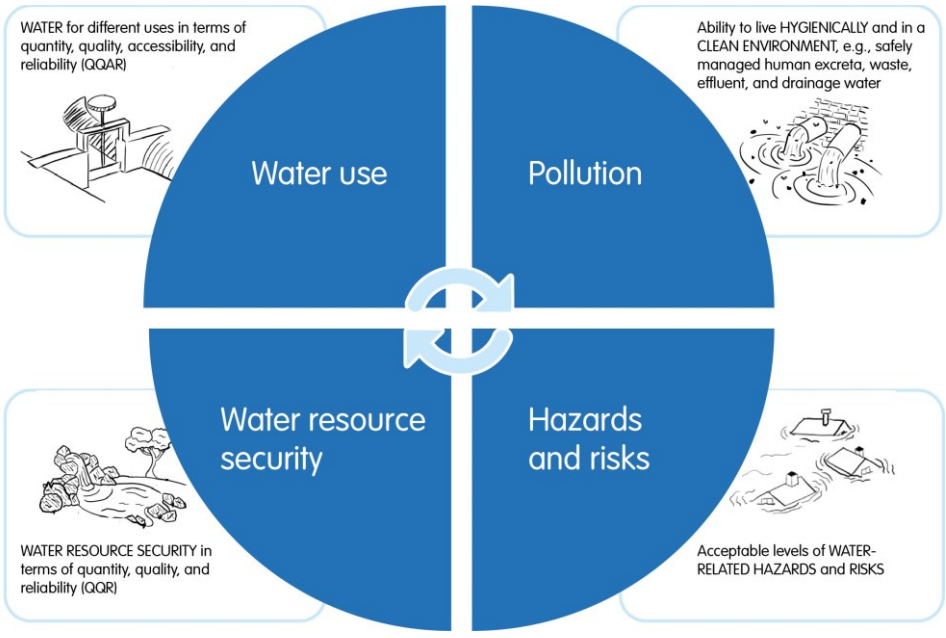
- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the second dimension of water security, namely: being able to live hygienically and free from pollution caused by the practice of irrigation. This will generally be agrochemicals. Your metric should be expressed in numbers of people cultivating irrigated plots, even if you consider measurement downstream.

Measurement of quality of drainage water or return flows from irrigation is not common. This is a gap because agrochemicals are significant pollutants of surface water and in some cases even reaching ground water sources. To find a practical way to do this in low-income contexts, is a bit of a puzzle.

You could consider the following:

- In theory, measurement of drainage water quality would link to each plot, but that will be unrealistic. Measurement downstream of channels carrying accumulated drainage would be an alternative.
- Measurement could take place in dry season, unless there is no cultivation in that season.
- We would want to be selective about the parameters to measure (N, P from fertizer, selected pesticide residue). Parameters should be aligned with country norms.
- An alternative to measuring water quality could be to observe safe management practices at plot level, but this would be a proxy indicator.
- It is a point of discussion whether to include hygiene aspects of agro-chemical pollution, similar as for sanitation and hygiene...



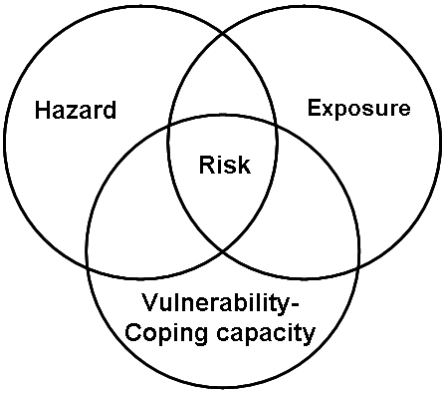
DIMENSION 3: WATER-RELATED HAZARDS AND RISK FOR PEOPLE IN IRRIGATION

The ambition is to improve **Water Security for All.** We use the following definition of water security:

- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the third dimension of water security, namely: 3) an acceptable level of water-related hazards and risks, namely floods, severe storms and drought. Your metric should be expressed in numbers of people with an acceptable level of risk.

There are no standardised measurements for flood, storm and drought risk in rural areas with irrigation.

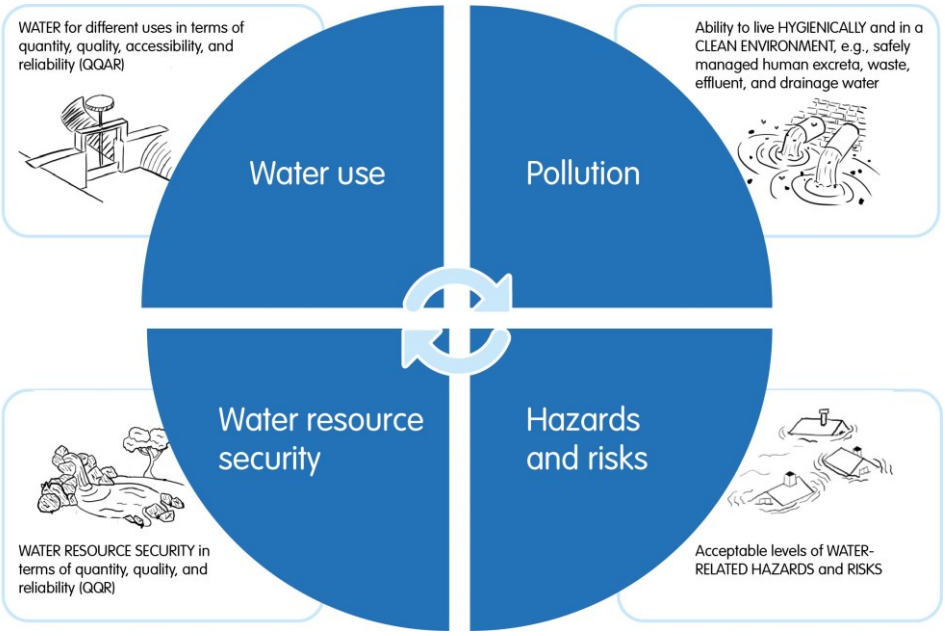


Note this is not just the risk for their irrigation facilities but for their livelihood as a whole, it may include for example:

- Health impacts (injuries, disease, loss of life, mental health issues)
- Evacuation (planned/ unplanned) or prolonged displacement
- Inaccessibility and/or damage to WASH facilities
- Damage to house, crop, livestock, means of transport
- Loss of income or job

When we measure risk, we need to consider that this is a combination of the hazard, the exposure to the hazard and the vulnerability. To reduce the level of risk, efforts focus on reducing exposure and vulnerability, because hazards (storm, flood or drought event) are beyond our control.

Yet we do not just want to see whether measures to reduce exposure and vulnerability are in place. Ideally we also want to know whether the risk and damage are reduced. This is a small puzzle for you!



DIMENSION 4: WATER RESOURCE SECURITY FOR IRRIGATION

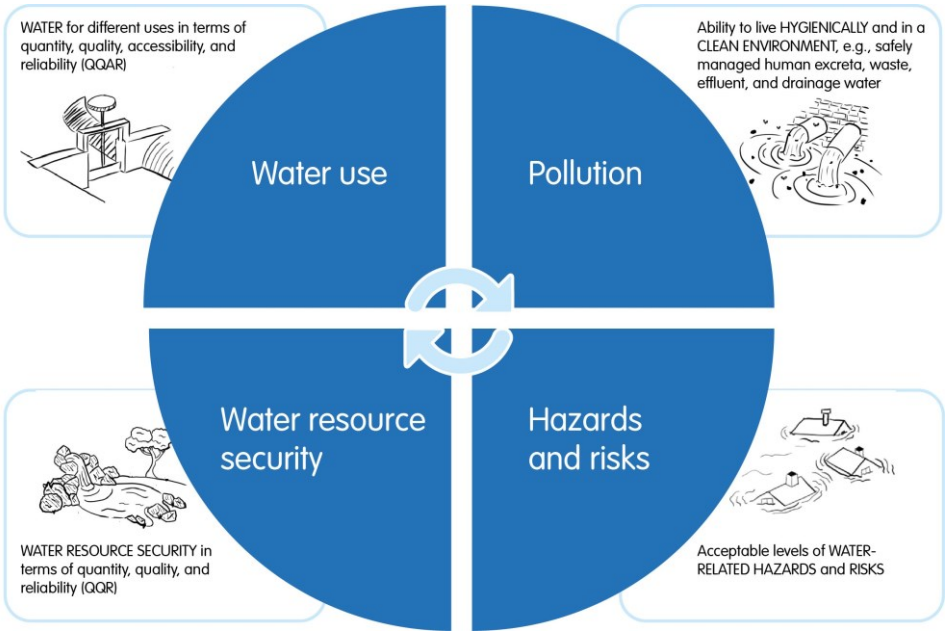
The ambition is to improve **Water Security for All.** We use the following definition of water security:

- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the fourth dimension of water security, namely: 4) have water resource security in terms of quantity, quality, reliability. This is a big thing for irrigation. Your metric should be expressed in numbers of people who rely on the water source(s).

To distinguish between dimension 2 (pollution caused by irrigation drainage water) and this dimension 4 (water resource security), we will focus this dimension 4 on the quantity, quality and reliability of intake water. We're interested in total water footprint, water stress and ambient water quality. See below. Water use efficiency (crop per drop), is not part of this dimension, but an outcome of field level irrigation improvements.

Quantity	*Water source provides sufficient water for all agreed (licensed or other) raw water intake AND Total volume of raw water intake by all major sectors does not jeopardise the environmental requirements of the waterbody (causing it to deplete) (see "water stress[4]")*
Quality	*Water source with good ambient water quality[5]*
Reliability	*Natural fluctuations in the water resource are not significantly altered[6] meaning permanent flow becoming seasonal, or reduced discharge (threshold based on river specific flow duration curves for example).*



[4] SDG indicator 6.4.2 "Level of water stress: freshwater withdrawal as a proportion of available freshwater resources"
[5] SDG indicator 6.3.2 "Proportion of bodies of water with good ambient water quality", including 5 parameters: oxygen (surface water); salinity (surface water and groundwater); nitrogen (surface water and groundwater); phosphorus (surface water) ; acidification (surface water and groundwater). https://www.unwater.org/our-work/integrated-monitoring-initiative-sdg-6/indicator-632-proportion-bodies-water-good-ambient
[6] See also https://www.sdg661.app/productsmethods

DIMENSION 1: WATER USE FOR WATER RESOURCE MANAGEMENT

The ambition is to improve **Water Security for All.** We use the following definition of water security:

- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

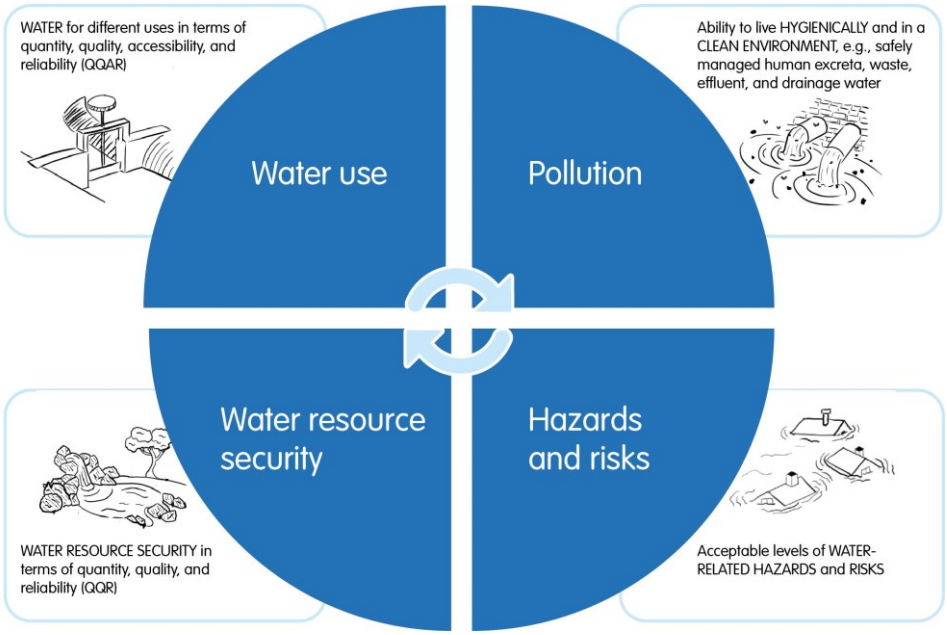
Water security has 4 dimensions (see figure). Your group will explore the first dimension of water security, namely: the quantity, quality, availability, and reliability (QQAR) of different water uses (drinking, productive, livestock) at the point of collection of the water system. Hence if it is a gravity-flow irrigation system or gravity fed water supply system, this is at their intake. Not at the point of use. Ultimately we would aim to express this metric also in terms of numbers of people relying on the resource, but for now, it can be in "bulk users".

With dimension we are looking at the total and individual water footprint of different uses, and the equality between them. Of course if there are two cities in the area each is one "use".

You could consider the following:

- Quantity of water in volumes or shares of each use, this could refer to the license or permit.
- Quality of water linked to the quality required for that use
- Accessibility of water for water for different uses, depends on the infrastructure in place.
- Reliability is measured considering the interruptions of access for each use.

In theory, we could also include ecological use as one of the uses. But we are addressing this under dimension 4.



DIMENSION 2: LIVING IN A CLEAN ENVIRONMENT FOR WATER RESOURCE MANAGEMENT

The ambition is to improve **Water Security for All.** We use the following definition of water security:

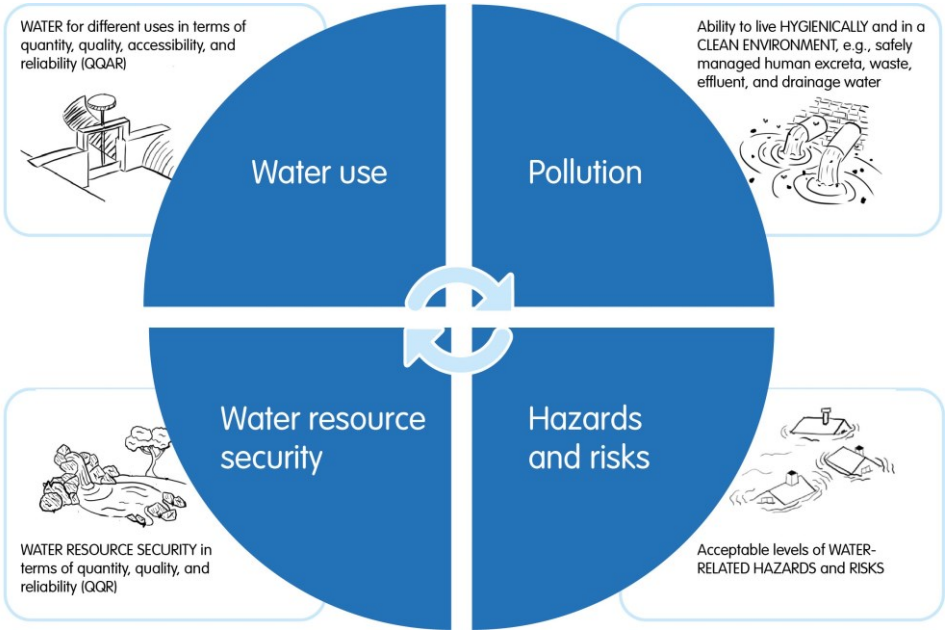
- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the second dimension of water security, namely: being able to live free from pollution, as caused by the different uses (drinking, productive, livestock) as total from that water system of use (or bulk user/ discharger). Hence if it is a gravity-flow irrigation system, this is at their drainage (hence it will be the same in definitions a dimension 2 from irrigation), for cities it will be their cumulative pollution through waste water, sanitation, solid waste, potentially run-off. Ultimately we would aim to express this metric also in terms of numbers of people linked to the water system, but for now, it can be in "bulk users/ dischargers".

With dimension we are looking at the total and individual water pollution of different uses and the equality between them. Of course if there are two cities in the area each is one "system of use" (or "bulk user/ discharger").

You could consider the following:

- Quality of release waste or drainage water, relative to licences or environmental standards of the country
- The focus of quality of effluent/ discharge by bulk dischargers is on their regular practice. There may also be illegal discharge or incidental releases of highly contaminated effluent, but this is considered out of scope for now
- The most challenging to incorporate is non-point pollution, hence pollution coming from disperse sources. For now we can try to group these as "bulk dischargers" of a certain type.



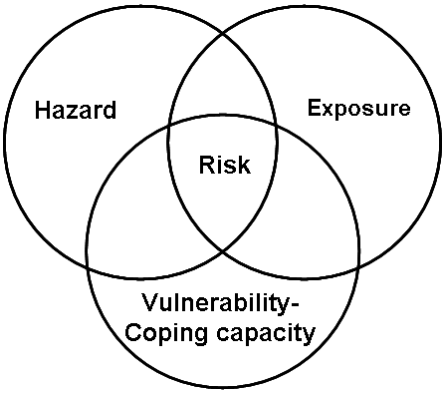
DIMENSION 3: WATER-RELATED HAZARDS AND RISK FOR PEOPLE IN WATER RESOURCE MANAGEMENT

The ambition is to improve **Water Security for All.** We use the following definition of water security:

- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the third dimension of water security, namely: 3) an acceptable level of water-related hazards and risks, namely floods, severe storms and drought. Your metric should be expressed in numbers of people with an acceptable level of risk.

Unlike the JMP guidance for water, sanitation and hygiene access, there are no standardised measurements for flood, storm and drought risk in rural areas.

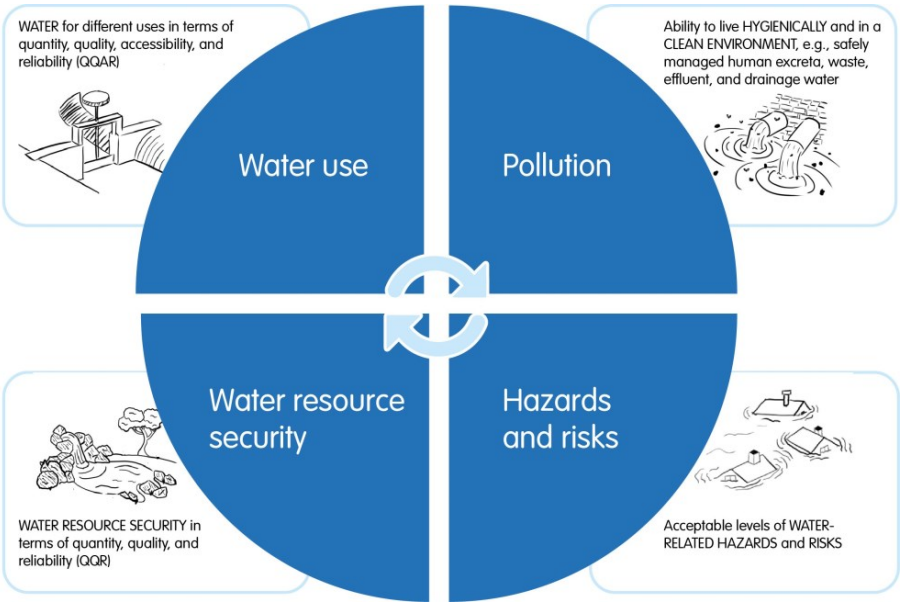


Note this is not just the risk for their water facilities but for their livelihood as a whole, it may include for example:

- Health impacts (injuries, disease, loss of life, mental health issues)
- Evacuation (planned/ unplanned) or prolonged displacement
- Inaccessibility and/or damage to WASH facilities
- Damage to house, crop, livestock, means of transport
- Loss of income or job

When we measure risk, we need to consider that this is a combination of the hazard, the exposure to the hazard and the vulnerability. To reduce the level of risk, efforts focus on reducing exposure and vulnerability, because hazards (storm, flood or drought event) are beyond our control.

Yet we do not just want to see whether measures to reduce exposure and vulnerability are in place. Ideally we also want to know whether the risk and damage are reduced. This is a small puzzle for you!



DIMENSION 4: WATER RESOURCE SECURITY FOR WATER RESOURCE MANAGEMENT

The ambition is to improve **Water Security for All.** We use the following definition of water security:

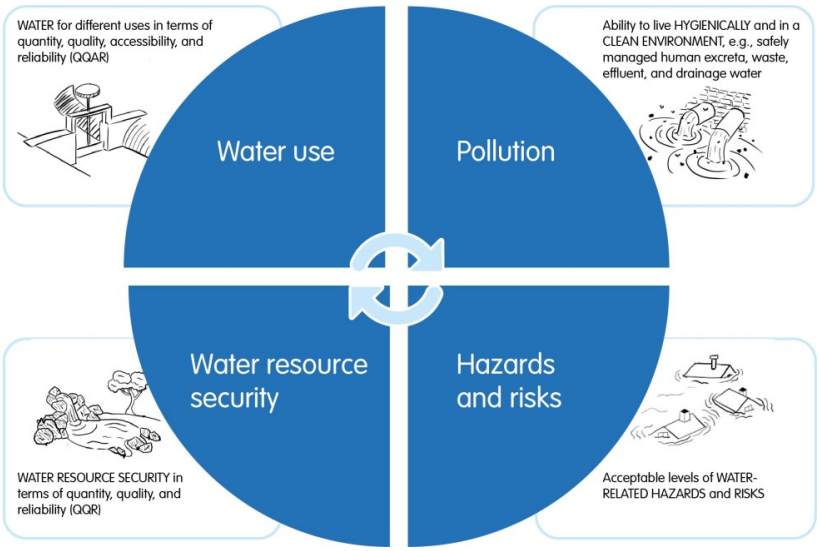
- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the fourth dimension of water security, namely: 4) have water resource security in terms of quantity, quality, reliability. Ultimately we would aim to express this metric also in terms of numbers of people linked to the water system, but in the case of key water bodies in an hydrological area, this would include all people living in the area.

For Water Resource Management this will be the quality, quantity and reliability of key water bodies in a hydrologically defined area (e.g. watershed, micro-watershed). The key water bodies are those central for both human and natural uses, as well as for recharge, storage or natural water purification.

Conservation practices in a hydrological area are aimed to contribute to the quality, quantity and reliability of key water bodies, but these would be proxy indicators. The aspiration is to find a metrics for the actual quality, quantity and reliability across the hydrological area. This could be done through secondary data -if available.

Quantity	*The combined water bodies provide sufficient water for all agreed (licensed or other) raw water intake AND* *Total volume of raw water intake by all major sectors does not jeopardise the environmental requirements of the main waterbodies (causing it to deplete) (see "water stress[7]")*
Quality	*The key water bodies with good ambient water quality[8]*
Reliability	*Natural fluctuations in the water bodies are not significantly altered[9] meaning permanent flow becoming seasonal, or reduced discharge (threshold based on river specific flow duration curves for example).*



[7] SDG indicator 6.4.2 "Level of water stress: freshwater withdrawal as a proportion of available freshwater resources"
[8] SDG indicator 6.3.2 "Proportion of bodies of water with good ambient water quality", including 5 parameters: oxygen (surface water); salinity (surface water and groundwater); nitrogen (surface water and groundwater); phosphorus (surface water) ; acidification (surface water and groundwater). https://www.unwater.org/our-work/integrated-monitoring-initiative-sdg-6/indicator-632-proportion-bodies-water-good-ambient
[9] See also https://www.sdg661.app/productsmethods

DIMENSION 1: WATER USE FOR URBAN WASH

The ambition is to improve **Water Security for All.** We use the following definition of water security:

- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

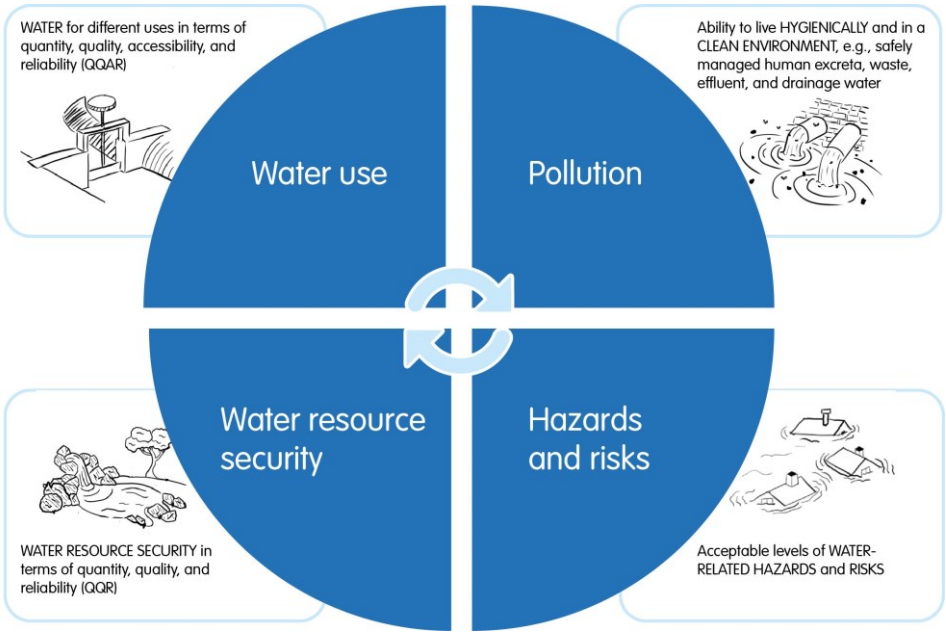
Water security has 4 dimensions (see figure). Your group will explore the first dimension of water security, namely: the quantity, quality, availability, and reliability (QQAR) of access to water supply at point of use.

JMP already provides a measurement standard of safely managed drinking water, the question is whether you would change or modify something to include the aspect of climate resilience better.

You could consider the following of current measurement practice:

- Quantity of water. Although most countries have national standards for the volume of water per capita, these are used for design not for monitoring of access. Also JMP does not monitor the quantity of water that households use.
- Quality of water, this is part of the JMP standard for safely managed water supply, but it is challenging to implement water quality testing sustainabily and at scale.
- Accessibility of water is measured with JMP, namely duration of a round trip of water collection and connection on the premise.
- Reliability is not measured in JMP, though there are examples of measuring downtime and number of hours with water per day.

Urban households may be using multiple water sources. Currently measurement of water access tends to consider only the "primary water source". There could be arguments to include secondary water sources if we want to have better insight into climate resilience.



DIMENSION 2: LIVING IN A CLEAN ENVIRONMENT IN URBAN AREAS (WASTE AND HYGIENE)

The ambition is to improve **Water Security for All.** We use the following definition of water security:

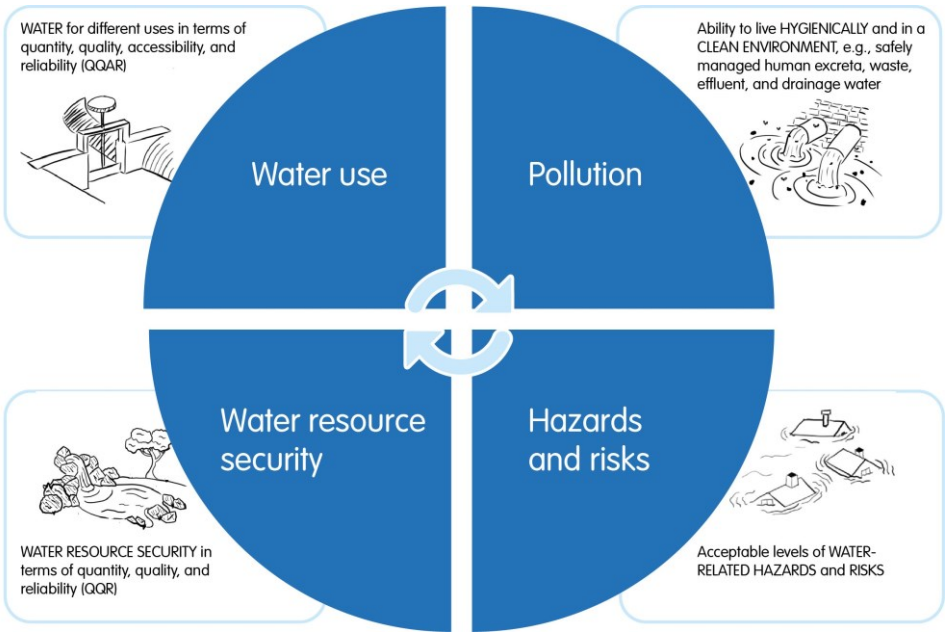
- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the second dimension of water security, namely: being able to live hygienically and free from pollution, e.g., from human waste, waste water, solid waste. For urban households this entails access to on-site and off-site sanitation, solid waste management, and key hygiene behaviours. It could potentially also include grey water management at household level. Your metric should be expressed in numbers of people with access.

JMP already provides a measurement standard for sanitation and hygiene in WASH, the suggestion is to start from that practice, and then consider whether we would change or add something in that to include all kinds of waste and/or to include the aspect of climate resilience better. Note that water resource security and its water quality are measured in dimension 4.

You could consider the following of current measurement practice:

- Based on toilet types: sanitation aims to separate human faeces from human contact. Effective separation is called “improved”. We use “toilet types” as a proxy to determine whether sanitation is “improved”, but toilets are far from standard.
- No information on ground water contamination by toilets.
- Sludge management of on-site sanitation is a development area.
- Measurement includes observation as to whether the toilet is in use, not use by all.
- Hand washing with soap measured through a proxy.



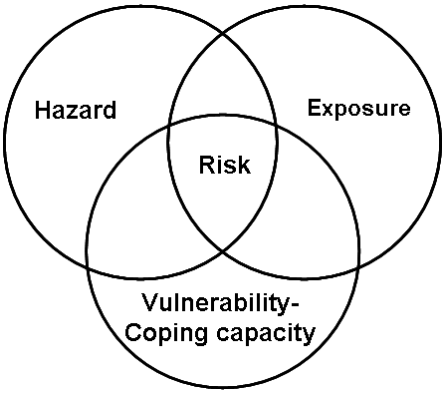
DIMENSION 3: WATER-RELATED RISK IN URBAN AREAS

The ambition is to improve **Water Security for All.** We use the following definition of water security:

- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the third dimension of water security, namely: 3) an acceptable level of water-related hazards and risks, namely floods, severe storms and drought. Your metric should be expressed in numbers of people with an acceptable level of risk.

Unlike the JMP guidance for water, sanitation and hygiene access, there are no standardised measurements for flood, storm and drought risk in urban areas.

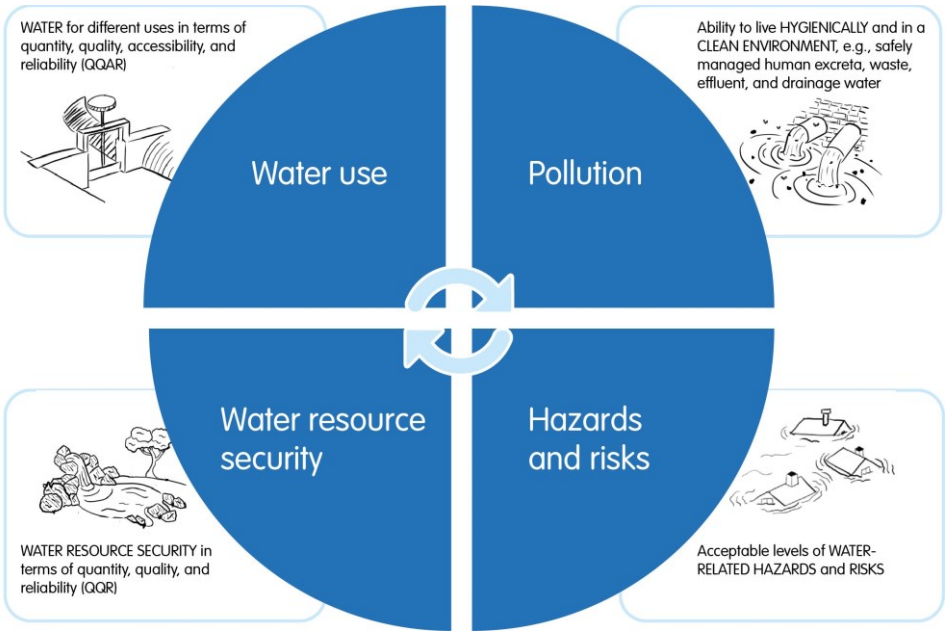


Note this is not just the risk for their WASH facilities but for their livelihood as a whole, it may include for example:

- Health impacts (injuries, disease, loss of life, mental health issues)
- Evacuation (planned/ unplanned) or prolonged displacement
- Inaccessibility and/or damage to WASH facilities
- Damage to house, business, livestock, means of transport
- Loss of income or job

When we measure risk, we need to consider that this is a combination of the hazard, the exposure to the hazard and the vulnerability. To reduce the level of risk, efforts focus on reducing exposure and vulnerability, because hazards (storm, flood or drought event) are beyond our control.

Yet we do not just want to see whether measures to reduce exposure and vulnerability are in place. Ideally we also want to know whether the risk and damage are reduced. This is a small puzzle for you!



DIMENSION 4: WATER RESOURCE SECURITY FOR URBAN AREAS

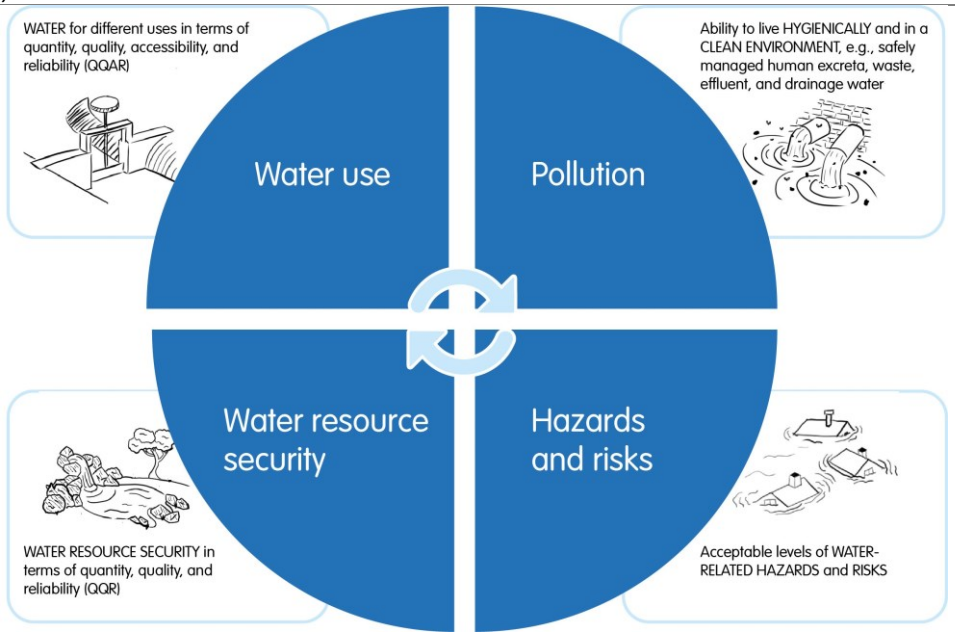
The ambition is to improve **Water Security for All.** We use the following definition of water security:

- *the reliable availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks*

Water security has 4 dimensions (see figure). Your group will explore the fourth dimension of water security, namely: 4) have water resource security in terms of quantity, quality, reliability. For Urban Water Cycles, this links essentially to the sustainability and sanitary management of the drinking water source(s) (being ground water or surface water). Your metric should be expressed in numbers of people who rely on the water source(s).

Unlike the JMP guidance for water, sanitation and hygiene access, there are no standardised measurements for the quality, quantity and reliability of the water source in WASH. However, we are not at zero either, see also below. Note that ideally we would want to measure the state of the resource today, not just a proxy like having protective measures in place like in water safety planning.

Quantity	*Water source provides sufficient water for all agreed (licensed or other) raw water intake AND Total volume of raw water intake by all major sectors does not jeopardise the environmental requirements of the waterbody (causing it to deplete) (see "water stress[10]")*
Quality	*Water source with good ambient water quality[11]*
Reliability	*Natural fluctuations in the water resource are not significantly altered[12] meaning permanent flow becoming seasonal, or reduced discharge (threshold based on river specific flow duration curves for example).*



[10] SDG indicator 6.4.2 "Level of water stress: freshwater withdrawal as a proportion of available freshwater resources"

[11] SDG indicator 6.3.2 "Proportion of bodies of water with good ambient water quality", including 5 parameters: oxygen (surface water); salinity (surface water and groundwater); nitrogen (surface water and groundwater); phosphorus (surface water) ; acidification (surface water and groundwater). https://www.unwater.org/our-work/integrated-monitoring-initiative-sdg-6/indicator-632-proportion-bodies-water-good-ambient

[12] See also https://www.sdg661.app/productsmethods