



**AGREEMENT**

**BETWEEN**

**THE REPUBLIC OF MOZAMBIQUE**

**AND**

**THE REPUBLIC OF ZIMBABWE**

**ON**

**CO-OPERATION ON THE DEVELOPMENT, MANAGEMENT AND SUSTAINABLE  
UTILISATION OF THE WATER RESOURCES OF THE PUNGWE WATERCOURSE**

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## PREAMBLE

The Republic of Zimbabwe and the Republic of Mozambique (hereinafter individually referred to as the "Party" and jointly referred to as the "Parties");

**BEARING IN MIND** the principles advocated in the Declaration by the Heads of State or Government of Southern African States "Towards the Southern African Development Community" and the Treaty of the Southern African Development Community signed on 17 August 1992;

**CONSCIOUS** of the mutual advantages of co-operation with regard to the utilisation and development of shared transboundary water resources and the significant contribution which such co-operation could make towards the peace and prosperity of the Parties;

**CONSCIOUS** of the paucity, value of water resources and the need to provide the Parties with access to sufficient and safe water supplies;

**AKNOWLEDGING** the effects of Climate Change on water resources management and development and the environment;

**COMMITTED** to the realisation of the principles of equitable and reasonable utilisation as well as the efficient management and sustainable development of the Pungwe Watercourse;

**DETERMINED** to co-operate, seek mutually satisfactory solutions for the needs of the Parties towards water protection and to ensure the sustainable, equitable and participatory management of the water resources of the Pungwe Watercourse, and increase the derived social and economic benefits for the people living in the basin, and other stakeholders;

**EXPRESSING** their common desire to proceed with sustainable development on the basis of Chapter 18 of Agenda 21, adopted by the United Nations Conference on Environment and Development on 14 June 1992;

**DESIROUS** of extending and consolidating the existing relations of good neighborliness and co-operation with regard to the management and development of the water resources of the Pungwe Watercourse on the basis of the Convention on the Law of the Non-navigational Uses of International Watercourses, adopted by the General Assembly of the United Nations on 21 May 1997, the Revised SADC Protocol on Shared Watercourses in the Southern African Development Community, adopted in August, 2000 as well as the Joint Water Commission (hereinafter referred

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**“Ministers”** means Ministers responsible for water affairs of the Parties;

**“Ongoing activity”** means any activity that would have been subjected to a decision of a competent authority in accordance with an applicable national procedure if it had been a planned measure.

**“Planned measure”** means any activity or a major change to an ongoing activity subject to a decision of a competent authority in accordance with applicable national procedures;

**“Pollution”** means any detrimental alteration in the composition or quality of the waters of a shared watercourse, which results directly or indirectly from human conduct;

**“Pungwe Watercourse”** means the system of surface and ground waters of the Pungwe constituting, by virtue of their physical relationship a unitary whole flowing normally into a common terminus, the Indian Ocean.

**“SADC Protocol”** means the Revised SADC Protocol on Shared Watercourses in the Southern African Development Community signed on the 7<sup>th</sup> of August 2000 in Windhoek - Namibia;

**“Significant harm”** means non-trivial harm capable of being established by objective evidence without necessarily rising to the level of being substantial.

**“Strategic Plan”** means a master development plan comprising a general planning tool and process for the identification, categorisation and prioritisation of projects and programmes for the efficient management and sustainable development of the Pungwe Watercourse;

**“Sustainable Development”** is development which meets the needs of present generations without compromising future generations to meet their own needs;

**“Trans-boundary Impact”** means any adverse effect, caused by human conduct, within an area under the jurisdiction of a Party caused by a proposed activity, the physical origin of which is situated wholly or in part within the area under the jurisdiction of the other Party;

## **ARTICLE 2**

### **Scope**

This Agreement applies to management and protection measures related to the development and use of the Pungwe Watercourse shared by the Parties.

## **ARTICLE 3**

### **Objective**

The objective of this Agreement is to promote coordinated co-operation between the Parties to ensure development, management and sustainable utilisation of the water resources of the Pungwe Watercourse.

## **ARTICLE 4**

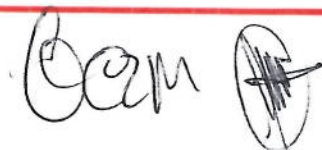
### **General Principles**

1. In the implementation of this Agreement, the Parties commit themselves to the general principles of the SADC Protocol which include, but are not limited to the following:
  - a) Sustainable utilisation;
  - b) Equitable and reasonable utilisation;
  - c) Protection, preservation and conservation of the environment; and
  - d) Prevention and mitigation of significant harm.
2. These principles shall be interpreted according to the provisions of Article 3 of the SADC Protocol and developed in accordance with the best international practices.

## **ARTICLE 5**

### **Responsibilities of the Parties**

1. The Parties shall, individually and, where appropriate, jointly, develop and adopt technical, legal, administrative and other reasonable measures in order to:
  - a) prevent, reduce and control pollution of surface and ground waters and protect and enhance the quality status of the waters and associated ecosystems for the benefit of present and future generations;
  - b) prevent, eliminate, mitigate and control trans-boundary impact;
  - c) co-ordinate management plans and planned measures, in accordance to Article 4 (1) of the SADC Protocol;
  - d) promote partnership and stakeholder involvement for effective and efficient water use and management;



- e) promote the security of relevant water related infrastructure and prevent accidents;
  - f) monitor and mitigate the effects of floods and droughts;
  - g) provide warning of possible floods and implement agreed upon urgent measures during flood situation;
  - h) establish comparable monitoring systems, methods and procedures;
  - i) exchange information on the water resources quality, quantity and use;
  - j) promote the implementation of this Agreement according to its objectives and defined principles; and
  - k) implement capacity and confidence building programmes.
2. The Parties shall co-operate with the SADC organs and other shared watercourse institutions.
  3. The Parties shall give their full co-operation and support to the decisions of the Joint Water Commission (JWC), and shall take the necessary legislative, administrative, technical and other measures to give effect to this Agreement or such decisions.
  4. The Parties shall conduct their management and development plans, projects and programmes relating to the resources of the Pungwe Watercourse in accordance with the Strategic Plan.
  5. The Parties shall in their respective countries adopt a stakeholder participatory approach in the management, development and utilisation of the water resources of the Pungwe Watercourse.

## **ARTICLE 6**

### **Shared Watercourse Institutions**

1. The advisory body for co-operation between the Parties is the JWC.
2. The JWC shall exercise the powers established in the JWC Agreement of 2002.
3. The Parties may establish a joint institution, through an Agreement, to carry out daily activities related to the management of the Pungwe Watercourse.
4. In the event of the establishment of the joint institution referred to in sub-Article 3 of this Article, the institution shall provide regular reports to the JWC.

## ARTICLE 7

### Sustainable Utilisation

1. The Parties shall be entitled, in their respective territories, to optimal and sustainable utilisation of and benefits from the water resources of the Pungwe Watercourse, taking into consideration the interests of the other Party, consistent with adequate protection of the Watercourse for the benefit of present and future generations.
2. The Parties shall co-ordinate their management activities by:
  - a) the exchange of information on their respective experiences and perspectives; and
  - b) the co-ordination of management plans, programmes and measures, as provided elsewhere in this Agreement.
3. In pursuing the objective of this Article, the Parties shall follow the Water Allocation principles stipulated in Article 17.
4. In further pursuance of the objective of this Article the Parties shall disclose, in terms of, Annex 3 their intentions of developing new projects that fall outside the scope of Annex 2 during the period of validity of this Agreement.
5. The Parties are committed to develop measures towards improvement of efficiency and rational use of water and its conservation and to promote more efficient water use through adopting better available technology.

## ARTICLE 8

### Equitable and Reasonable Utilisation

1. The Pungwe Watercourse shall be managed and utilized in an equitable and reasonable manner.
2. In the application of Equitable and Reasonable Utilization the Parties shall take into account all the relevant factors, and circumstances including the following:
  - a) geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character;
  - b) the social, economic, and environmental needs of the Parties;
  - c) the population dependent on the Pungwe Watercourse in the territory of the Parties;
  - d) the effects of the use(s) of the Pungwe Watercourse in either of the Parties territories;
  - e) existing and potential uses of the waters of the Pungwe Watercourse;
  - f) existing and planned infrastructure which has the capacity to regulate streamflow of the watercourse;
  - g) conservation, protection, development and economy of the use of the water resources of the Pungwe Watercourse and the costs of measures taken to that effect;



- h) the availability of alternatives of comparable value, to a planned or existing use of the waters of the Pungwe Watercourse;
  - i) agreements in force between the Parties.
3. The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is an equitable and reasonable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.
  4. The basis for water allocation of the Pungwe Watercourse is contained in Annex 2 of this Agreement.

## **ARTICLE 9**

### **Protection, Preservation and Conservation of the Environment**

1. The Parties shall, individually and, where appropriate, jointly, protect, preserve and conserve the ecosystem and the aquatic environment of the Pungwe Watercourse, taking into account generally accepted international rules and standards.
2. Either Party shall take all measures necessary to prevent the introduction of alien or new species, into the Pungwe Watercourse, which may have effects detrimental to the ecosystem of the Watercourse resulting in significant harm to the other Party.
3. In ensuring the protection and the preservation of the environment the Parties shall comply with the provisions of Article 4(2) of the SADC Protocol.

## **ARTICLE 10**

### **Prevention and Mitigation of Significant Harm**

1. Parties shall, in utilising the Pungwe Watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to the other Party.
2. Where significant harm is nevertheless caused to the other Party, the Party whose use causes such harm shall, take all appropriate measures, having due regard for the provisions of paragraph (1) above in consultation with the affected Party, to eliminate or mitigate such harm and where appropriate discuss the question of remedial action.
3. Unless the Parties concerned have agreed otherwise for the protection of the interests of persons, natural or juridical, who have suffered or are under a serious threat of suffering significant transboundary harm as a result of activities related to the shared Watercourse, the Parties shall not discriminate on the basis of nationality or residence or place where the

injury occurred, in granting to such persons, in accordance with its legal system, access to judicial or other procedures, or a right to claim compensation or other relief in respect of significant harm caused by such activities carried on in its territory.

## ARTICLE 11

### Water Quality and Prevention of Pollution

1. In order to protect and conserve the water resources of the Pungwe Watercourse, the Parties shall, through resolutions adopted by the JWC, and, when appropriate, through the co-ordination of management plans, programmes and measures:
  - a) develop an evolving classification system for the water resources of the Pungwe Watercourse;
  - b) classify and state the objectives and criteria in respect of water quality variables to be achieved through the agreed classification system for the water resources;
  - c) adopt a list of substances the introduction of which, is to be prohibited or limited, investigated or monitored in the water resources of the Pungwe Watercourse;
  - d) adopt techniques and practices to prevent, reduce and control the pollution and environmental degradation of the Pungwe Watercourse that may cause significant harm to the other Party or to their environment, including human health and safety or the use of the waters for any beneficial purpose, or to the living resources of the Watercourse; and
  - e) implement a regular monitoring programme including biological, physical and chemical aspects for the Pungwe Watercourse and report at the intervals established by the JWC on the status and trends of the associated aquatic, marine and riparian ecosystems in relation to the water quality of the Watercourse.
2. The Parties shall comply with the provisions of Annex 4 until such time that the water quality objectives and criteria are determined.

## ARTICLE 12

### Measurements of Water Quantity and Quality

The Parties shall establish, maintain and operate an effective and uniform system for making and recording continuous measurements of:

- a) the flow of the Pungwe watercourse and its tributaries within the boundaries of each Party and the volume of stored water, at such locations as the Parties may deem necessary to determine:



- (i) the volume of the intake from several portions of the catchment area of the Pungwe Watercourse;
  - (ii) the flow at selected locations along the Pungwe Watercourse; and
  - (iii) the losses from selected reaches of the Pungwe Watercourse, with their positions and modes of occurrence.
- b) all diversions, whether natural or artificial, from the Pungwe Watercourse and its tributaries.
- c) water quality of the Pungwe Watercourse and its tributaries and stored water at such locations as the Parties may deem necessary.

### **ARTICLE 13**

#### **Regular Exchange of Data and Information**

When sharing information and data the Parties shall:

- a) exchange available information on a regular basis on the condition of the Pungwe Watercourse, in particular that of hydrological, hydrogeological, meteorological, environmental conditions, water quality as well as related forecasts, as provided in the Annex 5;
- b) exchange data, information and study reports on the activities that are likely to cause significant trans-boundary impacts;
- c) exchange at intervals agreed by the JWC, information on the use, quantity and quality of the water resource and the ecological state of the Pungwe Watercourse necessary for the implementation of this Agreement;
- d) exchange information and consult each other and if necessary, negotiate the possible effects of planned measures on the condition of the Pungwe Watercourse;
- e) develop the appropriate measures to ensure that the information is homogenous, compatible and comparable as agreed by the JWC; and
- f) if a Party is requested by the other Party to provide data or any information referred to in this Article, that Party shall be obliged to comply with the request.

### **ARTICLE 14**

#### **Droughts and Floods**

1. The Parties undertake to implement the Pungwe Basin Flood and Drought Warning and Mitigation Strategy and any other strategies developed under the Pungwe Programme.
2. The allocation of the waters during drought periods shall be adjusted in accordance with the Annex 2 on Flow Regime which provide the basis on water allocation and also take into consideration recommendations from the Pungwe Basin Flood and Drought Strategy.



The Parties agree the priorities for water allocation as:

- a) Urban, rural and livestock consumption (Primary);
  - b) Industrial and Mining (IM) water use;
  - c) Irrigation;
  - d) Environmental Flows (reduced accordingly); and
  - e) Others.
3. The Parties shall notify each other without delay and by the most expeditious means of any flood danger.
  4. During flood alarm situations, the affected Party may require the other Party to adopt the measures referred to in the Pungwe Basin Flood and Drought Warning and Mitigation Strategy and any other urgent measures agreed upon, which may be deemed necessary.

## **ARTICLE 15**

### **Trans-boundary Impact**

1. The planned measures listed in Annex 3 regardless of their location that by themselves or by accumulation with the existing ones, have the potential of significant transboundary impact on the Watercourse, shall not commence before the provisions of Article 4(1) of the SADC Protocol are complied with.
2. Whenever, a planned measure, not listed in Annex 3, is likely to cause significant transboundary impact or if either Party expresses concern that such may occur, it shall not commence before the provisions of Article 4(1) of the SADC Protocol are complied with.
3. In case of planned measure involving a significant transboundary impact of substantial magnitude the Parties shall conduct an environmental impact assessment, which takes transboundary impact into account in accordance with procedures determined by the Parties.
4. Whenever an ongoing activity causes or is likely to cause a significant transboundary impact, which will lead a Party to comply with an obligation, the Party concerned shall address the matter through the co-ordination of management plans, programmes or measures.

## **ARTICLE 16**

### **Incidents of Accidental Pollution and Other Emergency Situations**

The Parties undertake through their relevant institutions to collaborate between themselves and ensure:

- a) immediately and by the most expeditious means available, notify the other Party, the SADC organs or any other authorised competent international organisations and

institutions of any incidents of accidental pollution and other emergency situations originating within their respective territories;

- b) prompt supply of the necessary information to the other Party and competent organisations with a view to co-operate in the prevention, mitigation and elimination of the harmful effects of the emergency;
- c) individually or jointly, develop contingency plans for responding to any incidents of accidental pollution and other emergency situations in co-operation, where appropriate, with other potentially affected and/or authorised competent international organisations to immediately take, all practicable measures necessitated by the circumstances to prevent, mitigate and eliminate the harmful effects of the emergency.

## **ARTICLE 17**

### **Flow Regime**

1. The flow regime of the Pungwe Watercourse is contained in Annex 2 on Flow Regime and Water Allocation.
2. Any abstraction of water from the Pungwe Watercourse, regardless of the use or geographical destination of such water, shall be in conformity with the Annex 2 on Flow Regime and Water Allocation and relevant provisions of this Agreement and its annexes.
3. The Parties have considered the following criteria in establishing the flow regime:
  - a) the geographical, hydrological, climatic and other natural characteristics of the Pungwe Watercourse;
  - b) the need to ensure water of sufficient quantity with acceptable water quality to sustain the watercourse and its associated ecosystems;
  - c) any present and foreseeable future water requirements; and
  - d) existing infrastructure which has the capacity to regulate the stream flow of watercourse.

## **ARTICLE 18**

### **Capacity Building**

1. The Parties shall:
  - a) identify and prioritize capacity building programmes necessary for the implementation and monitoring of this Agreement;
  - b) promote awareness and capacity building programmes for stakeholders; and
  - c) promote staff exchange programmes, joint study tours and river basin twinning programmes.
2. The Parties shall, individually and, where appropriate, jointly, be responsible for ensuring that capacity is developed in their respective territories.

## **ARTICLE 19**

### **Annexes**

The Annexes attached hereto are an integral part of this Agreement and may be amended by the Parties.

## **ARTICLE 20**

### **Settlement of Disputes**

1. Any dispute between the Parties concerning the interpretation or implementation of this Agreement shall be settled amicably by consultation between the Parties through the Diplomatic Channels;
2. While the process of dispute resolution is ongoing, the Parties agree not to proceed with the object of the dispute until it is resolved.

## **ARTICLE 21**

### **Amendments**

1. This Agreement may be amended at any time by mutual consent of the Parties, by an exchange of notes through the Diplomatic Channels. The date of entry into force of the amendment shall be the date of the last notification.
2. This Agreement may be revised and updated after ten (10) years of its entry into force.

## **ARTICLE 22**

### **Entry into Force, Duration and Termination**

1. This Agreement shall enter into force thirty (30) days after the deposit of the instrument of ratification by the Parties and shall remain in force for a period of ten (10) years.
2. The Agreement shall automatically be renewed for a similar period, unless either Party gives prior written notice of twelve (12) months of its intention to terminate the Agreement.
3. Unless otherwise specifically agreed by the Parties, termination shall not affect the validity of any ongoing activities not fully completed at the time of termination.

**ARTICLE 23**

**Depositary of the Agreement**

1. The Executive Secretary for SADC shall be the Depositary of this Agreement.
2. The Parties agree to inform each other on the completion of their internal legal processes. The last Party to complete the internal process of ratification shall inform the other and shall be responsible for registering the Agreement with SADC.

**IN WITNESS WHEREOF** the undersigned, being duly authorized by their respective Governments, have signed and sealed this Agreement in duplicate, in the English and Portuguese languages, both texts being equally authentic. In case of divergence in the interpretation of the Agreement, the English text shall prevail.

Signed at *CHINDIO*.....on this *11*.....day of the month of *July*.....2016

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**For the Republic of Mozambique**

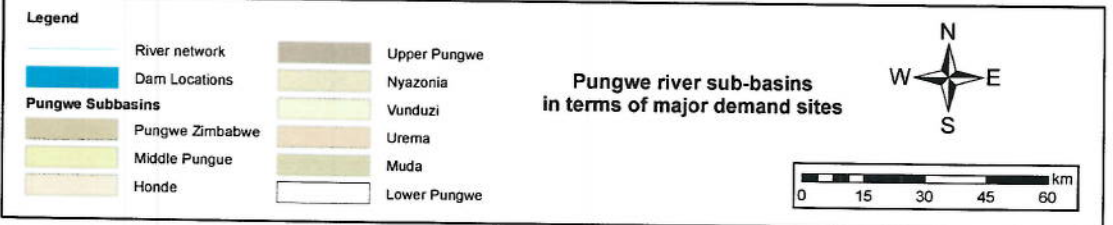
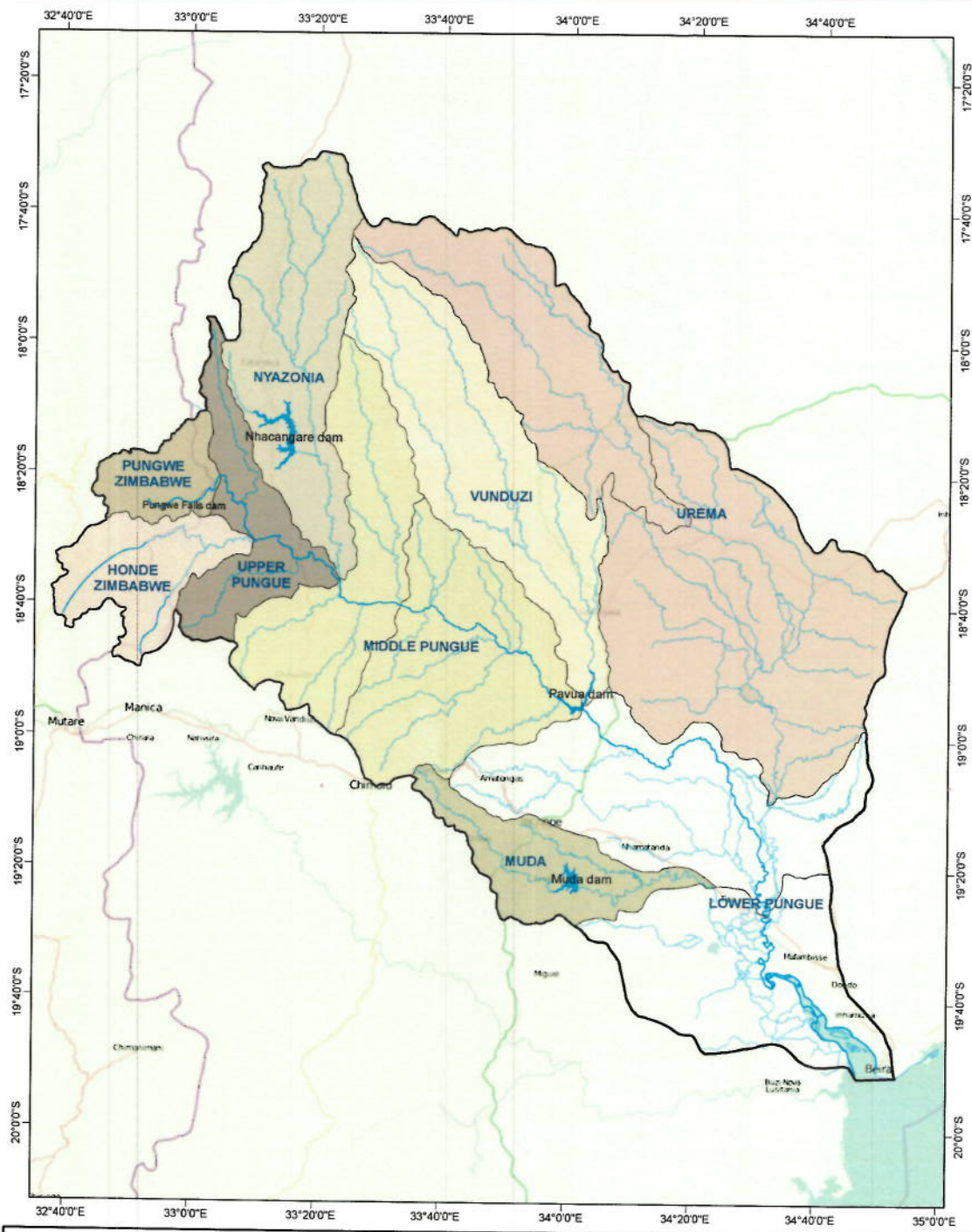
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**For the Republic of Zimbabwe**

**ANNEXES**

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**ANNEX 1**

**MAP OF THE PUNGWE  
WATERCOURSE**



Source: Pungwe IWRM Strategy 2007

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**ANNEX 2**

**FLOW REGIME AND WATER ALLOCATION**

## ANNEX 2

### FLOW REGIME AND WATER ALLOCATION

#### ARTICLE 1

##### Determining Criteria

1. Determination of the flow regime is based on the criteria in Article 8(2) of this Agreement.
2. The Parties accord a first priority to supply water for domestic, livestock and industrial use.
3. If, upon review of the hydrology of the system, more water is available in the Pungwe watercourse than that contemplated in this Annex, the Parties shall give priority to the water uses referred to in sub Article 1(2) of this Annex, when considering the allocation of the water.
4. Monitoring of the flow regime shall be carried out at appropriate hydrometrical stations as indicated in Annex 5 of the Agreement.

#### ARTICLE 2

##### Sub-catchments Considered for the Pungwe Watercourse

1. The Pungwe Watercourse, covering 31150 km<sup>2</sup>, is sub-divided into nine sub-catchments presented below.
  - a. The sub-catchments in Zimbabwe are:-
    - i. Pungwe Zimbabwe – 687 km<sup>2</sup>; and
    - ii. Honde Zimbabwe – 1245 km<sup>2</sup>
  - b. The sub-catchments in Mozambique are:-
    - i. Upper Pungwe – 2846 km<sup>2</sup>
    - ii. Nyazonia – 1360 km<sup>2</sup>
    - iii. Middle Pungwe – 5390 km<sup>2</sup>
    - iv. Vunduzi – 3439 km<sup>2</sup>
    - v. Urema – 8402 km<sup>2</sup>
    - vi. Muda – 1336 km<sup>2</sup>; and
    - vii. Lower Pungwe – 6445 km<sup>2</sup>
2. The net contributions to the total net natural mean annual runoff – MAR, in the natural condition without any land and water use effects and allowing for river channel losses, of 4272 million m<sup>3</sup> of the Pungwe watercourse at the estuary by the various catchments are estimated as follows:

- a) Pungwe Zimbabwe – 772 million m<sup>3</sup>
  - b) Honde Zimbabwe – 530 million m<sup>3</sup>
  - c) Upper Pungwe – 328 million m<sup>3</sup>
  - d) Nyazonia – 442 million m<sup>3</sup>
  - e) Middle Pungwe – 574 million m<sup>3</sup>
  - f) Vunduzi – 499 million m<sup>3</sup>
  - g) Urema – 509 million m<sup>3</sup>
  - h) Muda – 160 million m<sup>3</sup>
  - i) Lower Pungwe – 458 million m<sup>3</sup>
- Total Pungwe Basin – 4272 million m<sup>3</sup>

### ARTICLE 3

#### Utilisation of the Water Resources of the Pungwe Watercourse

1. Based on the estimates of the present availability of water in the Pungwe Watercourse, the Parties agree to the following annual water uses and areas of afforestation that will result in a reduction in stream flow of the Pungwe watercourse:

(a) **The Republic of Zimbabwe:**

- i. *Water supply to Mutare and industrial use – 111.6 million m<sup>3</sup>*
- ii. *Hauna growth point and rural water supply – 11.0 million m<sup>3</sup>*
- iii. *Irrigation Pungwe Zimbabwe – 65.8 million m<sup>3</sup>*
- iv. *Irrigation Honde – 41.5 million m<sup>3</sup>*
- v. *Tourism and livestock – 1.5 million m<sup>3</sup>*
- vi. *Reduction in streamflow due to afforestation (18 000 ha) – 161.3 million m<sup>3</sup>*

(b) **The Republic of Mozambique:**

- i. *Water supply to Beira and Dondo and industrial use – 98.4 million m<sup>3</sup>*
- ii. *Industrial use Middle Pungwe – 32.2 million m<sup>3</sup>*

- iii. *Rural water supply – 9.4 million m<sup>3</sup>*
- iv. *Tourism and livestock – 4.5 million m<sup>3</sup>*
- v. *Irrigation Nyazonia – 75.0 million m<sup>3</sup>*
- vi. *Irrigation Muda – 33.8 million m<sup>3</sup>*
- vii. *Irrigation Middle Pungwe – 48.8 million m<sup>3</sup>*
- viii. *Irrigation Lower Pungwe – 108.3 million m<sup>3</sup>*
- ix. *Additional irrigation Lower Pungwe with Pavua dam – 168.1 million m<sup>3</sup>*
- x. *Reduction in streamflow due to afforestation (80000 ha) – 96.0 million m<sup>3</sup>*

2. The water allocations in Zimbabwe, in particular the water supply to Mutare, assumes the construction of the Pungwe Falls Dam.
3. The water allocations in Mozambique, in particular the irrigation developments in the Nyazonia, Middle and Lower Pungwe, assumes the construction of the Nhacangare Dam. The additional irrigation in the Lower Pungwe is conditional to the construction of the Pavua Dam.
4. The Parties may convert some of their agreed irrigation use to first priority use at a conversion factor approved by the JWC at the time that the need arises.
5. The water use by Zimbabwe shall not exceed the following in the Pungwe and Honde sub-catchments:
  - (a) The Pungwe River sub-catchment up to the border with Mozambique:
    - i. *First priority supplies for Mutare, rural, industry and mining – 116.0 million m<sup>3</sup>/a*
    - ii. *Irrigation supplies – 65.8 million m<sup>3</sup>/a*
    - iii. *Tourism and livestock – 0.75 million m<sup>3</sup>/a*
    - iv. *Reduction in streamflow due to afforestation (9 300 ha) – 83.0 million m<sup>3</sup>/a*
  - (b) The Honde River sub-catchment up to the border with Mozambique:
    - v. *First priority supplies – 6.6 million m<sup>3</sup>/a*
    - vi. *Irrigation supplies – 41.5 million m<sup>3</sup>/a*

vii. *Tourism and livestock – 0.75 million m<sup>3</sup>/a*

viii. *Reduction in streamflow due to afforestation (8 700 ha) – 78.3 million m<sup>3</sup>/a*

6. The water use by Mozambique shall not exceed the following in the Nyazonia, Muda, Upper

Pungwe, Middle Pungwe and Lower Pungwe sub- catchments:

(a) The Nyazonia sub-catchment:

i. *Reduction in streamflow due to 37500 ha of afforestation – 45 million m<sup>3</sup>/a*

ii. *Irrigation supplies – 75.0 million m<sup>3</sup>/a*

(b) The Muda sub-catchment:

i. *Irrigation supplies – 33.8 million m<sup>3</sup>/a*

(c) The Upper Pungwe sub-catchment:

i. *Irrigation supplies – 5.0 million m<sup>3</sup>/a*

(d) The Middle Pungwe sub-catchment:

i. *Priority supplies for domestic, livestock, tourism, industry and mining – 46.1 million m<sup>3</sup>/a*

ii. *Reduction in streamflow due to 42500 ha of afforestation – 51.0 million m<sup>3</sup>/a*

iii. *Irrigation supplies – 43.8 million m<sup>3</sup>/a*

(e) The Lower Pungwe sub-catchment:

i. *Priority supplies for Beira, Dondo, rural, industry and mining – 98.4 million m<sup>3</sup>/a*

ii. *Irrigation supplies – 108.3 million m<sup>3</sup>/a plus an additional 168.1 million m<sup>3</sup>/a conditional on the construction of Pavua Dam.*

7 Until detailed studies on environmental flows required in the various sub-catchments and sections of the main river and tributaries are executed and the environmental flow can thus be defined, the Parties agree that sufficient water should flow in the river system and enter the Pungwe Estuary. The following flows, in million m<sup>3</sup>/month, have been considered to be adequate in normal years, with the average approximately equal to 15% of the MAR at the estuary, or 20.3 m<sup>3</sup>/s:

a) Wet months (December – April) – 15.9 m<sup>3</sup>/s

b) Dry months (May – November) – 3.4 m<sup>3</sup>/s

8. When the JWC determines that a drought condition exists and that the water use by the Parties as given in sub-Articles (1), (2), (3) and (4) must be reduced, the irrigation use

and the environmental flows shall be the first to be reduced. This shall be followed by reductions in the first priority use, in accordance with plans prepared by the different water users and approved by the JWC.

9. The operating rules of the existing and proposed dams may be reviewed by the JWC as and when necessary and the Parties shall enforce these operating rules to ensure that the river losses and the agreed water allocations of the various sectors in the Pungwe Watercourse are met.

10. The JWC shall approve the criteria for reducing water use that are included as part of the operating rules. These shall take account of the availability of water and the water requirements in sub-Articles (1), (2), (3) and (4),

11. The determining criteria defined in Article 1 and the acceptability of restrictions for the first priority and irrigation users and the tolerance of the riverine and estuarine ecosystems to reductions in water supply. Adequate account shall be taken of transmission losses and other return flows.

#### **ARTICLE 4**

##### **Water Conservation**

Any Party may use a reduction in the agreed water use by a particular sector, as a result of better management practices or other water conservation measures, including pricing policies, for any other purpose within its own territory, provided that the JWC shall be notified accordingly.

## **ARTICLE 5**


### **Generation of Hydropower**

A Party may utilize water within its own territory for the generation of hydropower at existing and future installations, after the Parties have agreed on the operating rules.

## **ARTICLE 6**

### **Concluding Provisions**

The JWC shall assess any problems regarding the flow regime, any problems that will affect the normal utilization of dams and any problems arising from the minimum flows specified to maintain the ecosystems, taking into consideration the provisions of Article 14 of the Agreement. Any affected Party shall inform the JWC about the problems, so that measures (In order to/so as to) may be considered and adopted to establish a temporary or revised interim flow regime conforming to the general criteria set out in Article 8(2) of the Agreement.



**ANNEX 3**  
**PLANNED DEVELOPMENT PROJECTS**

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## ANNEX 3

### PLANNED DEVELOPMENT PROJECTS

#### ARTICLE 1


##### Determining Criteria

1. The Parties accord a high priority to supply water for domestic, livestock and industrial use. In particular, the Parties recognize the strategic importance of guaranteeing the future water demand of the cities of Beira, Dondo and Mutare.
2. The Parties recognize the projects in this Annex as projects that are contemplated by the Parties to commence before 2025 and that have previously been identified and studied by one or more of the Parties for future implementation.
3. The projects are classified into water utilization projects and water resources development projects.
4. The Parties recognize the usefulness of studying the creation of structural and non-structural measures in order to make more water available, as indicated in Annex 2.
5. For the mere reason that a project is listed in this Annex, the Party is not exempted from complying with the provisions of the Agreement.
6. If more water is made available through structural and non-structural measures in the Pungwe watercourse, the Parties shall give priority to the water uses referred to in sub-Article 1 when considering the allocation of the water, taking into account the equitable and reasonable utilization by the Parties of the water resources of the Pungwe Watercourse.
7. A Party may develop any other project not listed in this Annex, in accordance with the provisions of the Agreement.

#### ARTICLE 2

##### Reference Projects in Zimbabwe

1. The following water utilization projects are contemplated in the Pungwe Watercourse in Zimbabwe:
  - a) Augmentation of the water supply to the city of Mutare, with additional water secured from the main Pungwe river, with the support of the Pungwe Fall Dam.



- b) Increased irrigation development in the Pungwe River sub-catchment, in the order of 4000 ha.
- c) Increased irrigation development in the Honde River sub-catchment, in the order of 2000 ha.

2. The following water resources development projects are contemplated in the Pungwe Watercourse in Zimbabwe:

- a) Construction of the Pungwe Falls Dam, planned to be 55 m high and with 25 million m<sup>3</sup> of live storage capacity, on the Pungwe River, to support the expansion of the water supply to the city of Mutare.
- b) Construction of small dams, less than 10 m high and storage capacity below 1 million m<sup>3</sup>, for local use for domestic supply, small scale irrigation and mini-hydropower.

### **ARTICLE 3**

#### **Reference Projects in Mozambique**

1. The following water utilization projects are contemplated in the Pungwe Watercourse in Mozambique:

- a) Augmentation of the water supply to the cities of Beira and Dondo, with additional water secured from the main Pungwe river, with the support of the Nhacangare and Pavua dams.
- b) Industrial water supply for the large agro-industrial project of 80000 ha of afforestation for industrial use and for the supporting housing and offices complex.
- c) Increased irrigation development along the Nyazonia river, in the order of 5000 ha, supplied by the additional water secured by the new Nhacangare Dam.
- d) Increased irrigation development along the Middle and Lower Pungwe, in the order of 15000 ha, supplied by the additional water secured by the Nhacangare and Pavua Dams.

2 The following water resources development projects are contemplated in the Pungwe Watercourse in Mozambique:

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- a) Construction of the Nhacangare Dam, planned to be 34m high and with 140 million m<sup>3</sup> of live storage capacity, on the river of the same name.
- b) Construction of the Pavua Dam, planned to be 84m high and with 292 million m<sup>3</sup> of live storage capacity, on the main Pungwe River.
- c) Construction of small dams, less than 10m high with storage capacity below 1 million m<sup>3</sup>, for local use, domestic supply, small scale irrigation and mini-hydropower.

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**ANNEX 4**

**GUIDELINES ON WATER QUALITY MONITORING**

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## ANNEX 4

### GUIDELINES ON WATER QUALITY MONITORING

#### ARTICLE 1

##### Objective of Water Quality Monitoring

The objective of water quality monitoring is to ensure that the Pungwe watercourse is used in a sustainable manner, in accordance with this Agreement, particularly Article 11.

#### ARTICLE 2

##### Water Quality Management

1. Water quality shall be described by the physical, chemical and biological characteristics of the watercourses.
2. Water quality shall be managed by considering the character and condition of the in-stream, riparian habitat and the characteristics, condition and distribution of the aquatic biota.
3. Specific studies shall be conducted by the JWC to define the requirements in terms of water quantity and quality for environmental conservation in important sections of the Pungwe river, its tributaries and at the estuary.

#### ARTICLE 3

##### Water Quality Management Goals

1. The water quality management goals for the Pungwe watercourse system must ensure that existing aquatic ecosystems are protected, allowing for the abstraction for use in the production of drinking water after appropriate treatment and for other water uses without treatment, prevention of significant adverse transboundary impacts, prevention on deterioration on the quality of the watercourses, and shall conform to the values set forth in the parameters indicated in Appendix A.
2. The JWC can review and may, at any time, revise the parameters, values and/or frequencies given in Appendix A. Revisions may be considered either at the request of a Party or on a proposal within the JWC, in respect of specific river reaches or estuary and whenever there are changes in the human, infrastructural and financial resources of any of the Parties or there are improvements in technical and scientific knowledge.

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3. The values mentioned in Appendix A may be temporarily waived in the case of extreme natural hydrological occurrences, including natural enrichment in certain substances. Where a Party waives the stipulated values, it shall forthwith notify the other Party thereof, stating its reasons, the periods anticipated and the proposed mitigation measures to be introduced, if any.

4. Whenever surface water fails to comply with the values for parameters set in Appendix A, the Parties shall consider adopting, with the least delay, the measures required for the improvement of its quality, including a thorough investigation of the relevant sources of point and diffuse pollution and the enforcement of suitable effluent discharge limits and programs of environmental management.

#### **ARTICLE 4**

##### **Monitoring of surface water quality**

1. Surface water sampling and analysis shall be done for the variables and at the frequency mentioned in Appendix A, and at the prioritized surface monitoring stations, listed in Appendix B or at suitable locations in the vicinity of these stations.

2. The results of the resource monitoring shall be exchanged within three months after sample analyses are done.

3. The Parties shall be alerted as soon as is practically possible if any extreme values are found for the parameters indicated, where use of the watercourse could pose a hazard to humans, other water uses or the environment.

4. Existing water quality data for the surface water monitoring stations in the Pungwe Watercourse, listed in Appendix B, shall be exchanged between the Parties within twelve months of signing of this Agreement.


5. An annual report on the water quality status at the monitoring stations shall be exchanged by each Party.

6. The Parties shall individually or, where agreed, jointly promote actions to identify, design, establish and re-enforce monitoring systems for the Pungwe watercourse.

#### **ARTICLE 5**

##### **Monitoring of Groundwater Quality**

Groundwater is part of the watercourse and the sustainable development of groundwater resources at a regional level shall be promoted. This shall include the assessment, exploitation and protection of the groundwater component of the Pungwe watercourses.

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## ARTICLE 6

### Bio-monitoring of Water Quality

1. Use of bio-monitoring method shall be made applied in the future, based on the analysis of benthic communities, mainly micro-invertebrates, fish and algae, as indicators of overall, integrated water quality.
2. A detailed environmental study shall be executed for the establishment of the baseline condition of the various sections of the river network to allow for the use of these bio-indicators.

### APPENDIX A: WATER QUALITY GUIDELINES

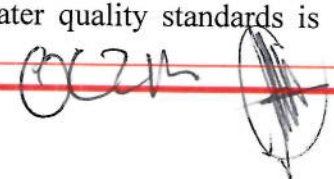
The parameters to be monitored in both countries shall be the ones included in the following table.

Parameter	Unit
Alcalinity	mg/L
BOD	mg/L
COD	mg/L
DO	mg/L
Chlorides	mg/L
Coliforms	PMN/100 mL
Conductivity	$\mu$ Ohm/cm
Nitrates	mg/L
Nitrites	mg/L
pH	-
Phosphates	mg/L
Sodium	mg/L
Sulphates	mg/L
Temperature	$^{\circ}$ C
TDS	mg/L
TSS	mg/L
Turbidity	NTU

The sampling and laboratory analysis should be made quarterly and more or less evenly distributed along the hydrological year, covering the wet and the dry seasons. If technical or financial reasons put a constraint on the number of measurements, the minimum should be two per year, one during the wet season and one during the dry season.

Water quality should also consider the content of metals, particularly cadmium, iron, lead, manganese, nickel, zinc and mercury. Although the laboratory analyses of these components are quite expensive, an effort should be made in both countries to do it once a year, even if in fewer sites which are deemed to be more critical.

The legal regulations defining the acceptable limits of the monitoring parameters in terms of water quality should be followed, until a general agreement on water quality standards is reached at the SADC level.



## APPENDIX B: SURFACE WATER MONITORING STATIONS

The suggested surface water monitoring stations in Zimbabwe are listed in the following table.

Reference	River
ER 109	Pungwe
ER 103	Honde
ER 110	Nyamukwara

The suggested surface water monitoring stations in Mozambique are listed in the following table.

Reference	Location
E-64	Pungwe Fronteira
E-65	Pungwe Sul
E-67	Mafambisse
E-70	Nhacangare
E-72	Nyazonia
E-73	Honde
E-74	Metuchira
E-80	Vanduzi
E-651	Gorongosa Ponte N1

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**ANNEX 5**  
**EXCHANGE OF INFORMATION**

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## ANNEX 5

### EXCHANGE OF INFORMATION

#### ARTICLE 1

##### General Principles

1. The Parties shall exchange or facilitate the exchange of information on water quantity, water quality, water use, hydraulic infrastructures and other relevant data and information.
2. The Parties shall individually or, where agreed, jointly develop a mutually accessible and appropriate website where information to be exchanged, as required in terms of the Main Agreement and this Annex, shall be posted and updated by the Parties.
3. The Parties shall put the necessary administrative procedures in place in order to comply with the exchange of information.
4. The Parties shall individually and, where agreed, jointly determine the budget necessary for the actions described, including activities for providing equipment, software and its installation, running and maintenance costs and training activities.
5. The Parties shall establish clear channels of communications, indicating the responsibilities of each involved institution, the personnel and the contacts (Telephone, Mobile/cell, fax and e-mail) as well as contacts for emergency situations.

#### ARTICLE 2

##### Use of Information and Data

1. Pungwe basin related information published by a Party within its territory may be used by the other Party for any purpose relevant to the objectives of the Agreement, subject to acknowledgment of the source.
2. Other information given by one Party to the other, shall be for the exclusive use and purpose of planning, development and management of the Pungwe watercourse.

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## ARTICLE 3

### Rainfall data

1. The following table lists the rainfall monitoring network whose data is to be collected and exchanged by the Parties.

Order	Location	Reference	Name
1	Zimbabwe	24797459	Chingamwe
2		24797947	Honde B. C.
3		67889030	Nyaga Exp Station
4		24799172	Nyangani Luleche
5	Mozambique	P-96	Dondo
6		P-106	Gondola
7		P-373	Chitengo O. P.
8		P-502	Macossa
9		P-812	Gorongosa
10		P-1272	Metuchira
11		P-1273	Nyazonia

2. In each station, data shall be collected on a daily basis.

3. Exchange of rainfall data shall be done on a monthly basis.

4. If a flood is foreseen or a high value of rainfall<sup>1</sup> is recorded in a station of a Party, the exchange of information shall be done on a daily basis.

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<sup>1</sup> For example, a value above the 80% probability threshold.

## ARTICLE 4

### Runoff Data

1. The following table lists the runoff monitoring network whose data is to be collected and exchanged by the Parties.

Order	Location	Reference	Name
1	Zimbabwe	F-14	Pungwe Falls
2		F-22	Katiyo
3	Mozambique	E-64	Pungwe Fronteira
4		E-65	Pungwe Sul
5		E-67	Mafambisse
6		E-70	Nhacangare
7		E-72	Nyazonia
8		E-73	Honde
9		E-74	Metuchira
10		E-80	Vanduzi
11		E-651	Ponte da EN-1 Gorongosa

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2. In each station, water level data should be collected on daily basis.
3. In each station not provided with a measuring weir, periodic flow measurements shall be made to allow for the re-calibration of the rating curve.
4. Water level data shall be converted into flow data using the adequate rating curve in each station.
3. Exchange of runoff data, comprising water levels, flows and flow measurements, should be done on a monthly basis.
4. If a flood is foreseen or a high water level, above a defined level of alarm, is recorded in a station of a Party, the exchange of information should be done on a daily basis.

**ARTICLE 5**  
**Water Quality Data**

1. The monitoring stations, the parameters to be observed and the frequency of sampling are defined in Annex 4.
2. Exchange of water quality data shall be done no later than three months after the results from the field and laboratory analyses are received.
3. The Parties shall be alerted as soon as practically possible if any extreme values are found for the parameters indicated where use of the watercourse could pose a hazard to humans, other water uses or the environment.

**ARTICLE 6**  
**Water Use Data**

1. The Parties shall collect and organize data on permits and effective water use in different categories: priority uses, namely urban, rural, livestock, tourism, industry and mining; irrigation; and afforestation.

2. Exchange of water use data shall be done on a yearly basis.

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## **ARTICLE 7**

### **Hydraulic infrastructures data**

1. The Parties shall exchange information about major hydraulic infrastructures, particularly storage dams higher than 6 meters, indicating the characteristics of the dam, spillway and outlets, storage capacity and any other relevant aspect.
2. Each Party shall receive from the owners or the operators of the dams in its country, at least on a monthly basis, the following daily data: water level at the reservoir, reservoir outflow, estimated inflow, rainfall and evaporation.
3. Exchange of reservoir data shall be done on a quarterly basis.
4. Each Party shall receive from the dam owners/managers or the operators within its country an annual report on the status of maintenance and safety of the dams. These reports shall be exchanged between the Parties not later than three months after reception.

## **ARTICLE 8**

### **Annual report**

Each Party shall prepare and send to the other Party an annual report, including hydrological data and analysis, water quality data and analysis, water use data and trends and hydraulic infrastructures.

## **ARTICLE 9**

### **Other relevant information**

The Parties shall exchange any other relevant information as soon as it becomes available, including, but not limited to:

- a) Study reports on the Pungwe Watercourse or relevant to the Pungwe basin;
- b) New legislation on water resources management or influencing water resources management;
- c) Policies and strategies for water resources development and management prepared at a national or regional level;
- d) Potential new large water users;
- e) Potential new sources of water pollution;
- f) Plans and studies for new hydraulic infrastructures, particularly storage dams.

