**SURVEY REPORT**

**THE BASIC CAPABILITY OF NMHSs IN RA II (ASIA)**



**WORLD METEOROLOGICAL ORGANIZATION**

**FEBRUARY 2017**

**EXECUTIVE SUMMARY**

The Members of WMO Regional Association II (RA II) have been surveyed in order to gather information on the basic capability of National Meteorological and Hydrological Services (NMHSs) in the Region. The Survey was conducted online using the SurveyMonkey platform during the period from October to November 2016. Thirty-three responses out of 35 Members were received.

The results of 2016 survey indicated steady improvement of weather, climate and water services by Members in RA II, but also showed the gaps among the members.

Most of the Members maintained highly qualified staff with specialized training and had a structured training plan for professional, technical and supporting staff, but 18 per cent of Members had the difficulty in maintaining such staff members. Meanwhile, as many as 70 per cent of Members acquired professional certification in respect of WMO’s latest personnel classification scheme.

The number of Members operating ground stations to receive high-resolution geostationary satellite images has increased significantly. Much more Members used the service of Regional Instrument Centres (RICs) to ensure the accuracy of the instruments.

In general, operational observation networks in the Region have been well maintained or enhanced. However there is also a serious concern that observational infrastructure, such as weather radar, wind profiler and lightning detection networks to detect severe weather phenomena, was far from sufficient in some Members to produce and provide reliable and timely forecast and warning services.

While there are still two Members which did not have connection with Regional Telecommunication Hubs, seventy-two per cent of Members benefited from WIS in terms of data exchange in part due to the enhancement in the capability of WIS implementation.

Most Members operated NWP system and utilized NWP products from major centres in the forecasting process but some Members need to improve development, access and usage of NWP guidance material as underlying support to prepare skillful, location-specific weather forecast for improving service delivery. The use of a nowcasting system for high impact weather warning should be enhanced urgently with the highest priority.

The number of Members implementing training and assessment procedures for personnel in order that they meet the competency requirements for the provision of aeronautical meteorological services has increased from 55 to 84 per cent.

There has been a significant increase in the number of Members explicitly providing monthly and/or seasonal climate predictions. Sixty-six per cent of Members provided agrometeorological information, forecasts and agrometeorological services to user community by promoting practical applications of technological advances. It is required to strengthen climate services including climate change, variability and prediction.

It was also found that many LDCs could not afford to have qualified technicians for the maintenance of observation instruments and communication infrastructure required for real-time delivery of observations. Overall however, there has been an improvement in aeronautical meteorological services in LDCs.

**TABLE OF CONTENTS**

**Executive Summary** …………………………………………………………………………………………………….…. 1

**1 Background**………………………………………………………………………………………………….……………..… 4

**2 Highlights of survey results** …………………………………………………………………………………….. 4

2.1 Management …………………………………………………………………………………………………………… 4

2.2 WMO Integrated Global Observing System (WIGOS) ………………………………….……… 5

2.3 WMO Information System (WIS) …………………………………………………………………………… 5

2.4 Data-processing and Forecasting System (DPFS) and Disaster Prevention ………. 6

2.5 Climate and Agricultural Meteorological Services …………………………………….…………… 6

2.6 Aeronautical and Marine Meteorological Services …………………………….…………………… 7

2.7 Hydrological forecasts and assessments …………………………….…………..…………………..8

2.8 Public weather services and Partnership ……………………………………….…………………… 8

**3 Issues in LDCs in the Region** ………………………………………………………………………………… 8

**4 Consideration of regional needs and priorities** ……………………..…………………………….10

Annex I Participated Members in the Survey

Annex II Survey Questionnaire and Results

Annex III Survey Responses

**LIST OF TABLES**

**Table 1:** Percentage of Members answering ‘yes’ to the questions regarding maintenance of observation systems…………………………….……………….…………………………………. 5

**Table 2:** Percentage of Members answered ‘yes’ to the questions regarding data-processing and forecasting systems…………………………….……………………………………………………. 6

**Table 3:** Percentage of Members answered ‘yes’ to the questions regarding (a) climate and (b) agricultural meteorological services………………………………….…………………………….…… 7

**Table 4:** Percentage of Members answered ‘yes’ to the questions regarding aeronautical meteorological services…………………………………………………………………………………………….……. 7

**Table 5:** Observational infrastructure for LDCs……………………………………………………………. 9

**Table 6:** Data-processing and forecasting systems for LDCs……………………………………….. 9

**Table 7:** Aeronautical meteorological services for LDCs……………………………………………. 9

1. **Background**
   1. At its fifteenth session held in Doha, Qatar, in December 2012, the WMO Regional Association (RA) II adopted the Strategic Operating Plan for the Enhancement of National Meteorological and Hydrological Services (NMHSs) in RA II (2012–2015), which was developed based on the survey results on the basic capabilities of NMHSs in RA II during 2010–2011. The report is available at:

<https://www.wmo.int/pages/prog/dra/documents/RAIISurveyReport2010-2011.pdf>.

* 1. To identify the progresses of RA II Members during the inter-sessional period in the implementation of the Strategic Operating Plan 2012–2015, the Association carried out a revised survey on the basic capability of NMHSs in the Region in 2016. The survey questionnaire consisted of 12 main topics including management, observing systems, telecommunications, data-processing and forecasting system, natural disaster prevention and mitigation, climate services, agricultural, aeronautical and marine meteorological services, hydrological services, public weather services, and partnership.
  2. The survey was conducted online using the SurveyMonkey platform during the period of October to November 2016. Thirty-three out of 35 Members responded to the survey (response rate: 33/35 = 94%). A list of participating Members is given in Annex I. Key findings of the survey are summarized below. It should be noted that the analysis of the survey is based on 33 Members’ returns and therefore the interpretation of the results has some limitations. The survey form is given in Annex II, with the analyzed result inserted, for reference.
  3. The members’ responses to the survey questionnaires are attached to this report as Annex III for reference.

1. **Highlights of survey results**

***2.1 Management***

(1) Eighty-two per cent of Members responded that they had legal basis for the provision of meteorological services, but yet 52 per cent of Members did not implement cost-recovery for the services.

(2) Eighty-two per cent of Members maintained highly-qualified staff with specialized training but compared with the last survey, the percentage has decreased by more than 10 per cent. This is considered due to difficulty of some Members to put emphasis on capacity development of human resources, and more effort should be put in to assist the remaining NMHSs to maintain high-quality staff. Meanwhile, 73 per cent of Members had access to and use e-learning materials, which might be good education materials.

(3) The percentage of Members which responded that their staff acquired the professional certification in respect of WMO’s latest personnel classification scheme has significantly increased from 53 per cent to 70 per cent. This is considered due to Members’ efforts to apply WMO’s latest classification scheme.

(4) Eighty-five per cent of Members responded that they engaged in continuous education programmes.

(5) Close cooperation with academia and media was very well kept at 91 per cent and 97 per cent, respectively. It is noted that close cooperation with private sector was also high at 88 per cent.

* 1. ***WMO Integrated Global Observing System (WIGOS)***

(1) The percentage of Members which answered ‘Yes’ to the questions regarding the observation systems in this and the last surveys are summarized in Table 1.

(2) The percentage of Members which implemented reliability measures on quality management routines and procedures of weather observations has remained high at 88 per cent.

(3) Members which delivered the measured observations at remote stations in real-time and those which worked towards enhancement of temporal and spatial coverage of their weather measurements have also remained high at 91 per cent and 88 per cent, respectively. On the other hand, Members carrying out regular maintenance and calibration of observation instruments have decreased from 90 per cent to 84 per cent and the rate of employing qualified maintenance technicians has also decreased from 83 per cent to 75 per cent. It is deemed that regular maintenance of the equipment and employing qualified human resources are one of the challenges for some Members.

(4) While there has been a significant increase of Members which operate weather radars, six Members (Afghanistan, Bhutan, Kyrgyzstan, Nepal, Sri Lanka and Yemen) do not still operate any weather radars, which is an essential observational tool for detecting detailed structure of severe storms and therefore a critical component of nowcasting system.

(5) There has also been an increase of Members which operated ground stations to receive high-resolution geostationary satellite images (from 77 per cent to 88 per cent), which is considered as a result of the support by satellite operating Members to install such systems. Meanwhile, the number of Members which operated the polar-orbiting satellite receiving systems was still low.

(6) It was shown that the percentage of Members which operated lightning detection networks has stayed low at 25 per cent. Considering that lightning is often related to severe storms and hence to possibility of disasters, the enhancement of the lightning detection network of the Members would be one of demanding issues.

(7) The percentage of Members using the service of Regional Instrument Centre (RIC) to ensure the accuracy of the instruments has increased from 47 per cent to 63 per cent. This is considered as a result of active contribution of RICs to the Members in the Region.

***Table 1.*** *Percentage of Members answering ‘yes’ to the questions regarding maintenance of observation systems*

|  |  |  |
| --- | --- | --- |
| **Questions** | **2011 (%)** | **2016 (%)** |
| II-1. Carries out regular maintenance and calibration of observation instruments | 90 | 84 |
| II-2. Implements reliability measures on quality management routines and procedures of weather observations | 90 | 88 |
| II-3. Implements real-time delivery of measured observations at remote stations | 87 | 91 |
| II-4. Enhances the temporal and spatial coverage of weather measurements | 87 | 88 |
| II-5. Has qualified maintenance technicians | 83 | 75 |

* 1. ***WMO Information System (WIS)***

(1) The speed of GTS connection to the Regional Telecommunication Hub (RTH) was analyzed with three categories: Category I with speed less than 9.6 kbps; Category II between 9.6 and 64 kbps; and Category III over 64 kbps. While 86 per cent of Members belonged to Category III, two Members (Afghanistan and Iraq) responded that there was no GTS connection with Regional Telecommunication Hubs (RTHs).

(2) Almost all Members were connected to the Internet but two (Kuwait and Kyrgyzstan) responded no operational Internet connection by broadband. Five Members were still running radiofacsimile broadcast of meteorological and oceanographic information.

(3) Seventy-two per cent of Members reported that they were benefited from WIS in terms of data exchange, which has been a significant increase by 20 per cent since the last survey. This is considered due to the enhancement in the capability of WIS implementation.

* 1. ***Data-processing and Forecasting System (DPFS) and Disaster Prevention***

(1) Seventy-eight per cent of Members answered that they implemented automatic data reception and archival. In view of the fact that automatic data processing is an essential component of efficient and effective early warning for disaster risk management, further improvement of capability of automatic data processing should be one of priority areas in the Region.

(2) Eighty-four per cent of Members were operating NWP system and 94 per cent of Members used and interpreted NWP products. The use of a nowcasting system for high impact weather warning has not yet been applied in more than half Members (53 per cent).

(3) Members using ensemble prediction system and consensus technique for tropical cyclone forecasting increased from 40 per cent to 53 per cent due to collaboration among Members and in support of WMO/ESCAP Panel on Tropical Cyclones and ESCAP/WMO Typhoon Committee (Table 2).

***Table 2.*** *Percentage of Members answered ‘yes’ to the questions regarding data-processing and forecasting systems*

|  |  |  |
| --- | --- | --- |
| **Questions** | **2011 (%)** | **2016 (%)** |
| IV-4. Automatic data-processing | 77 | 78 |
| IV-5. Runs NWP model(s) operationally | 67 | 84 |
| IV-6. Has access to NWP products from major centres operationally | 93 | 94 |
| IV-8. Operates a nowcasting system for high impact weather warning | 57 | 47 |
| IV-10. Extends the use of EPS and consensus technique for tropical cyclone forecasting | 40 | 53 |

(4) Ninety-four per cent of Members had links with national disaster managers. Given that yet 66 per cent of Members had a public education programme for disaster prevention and mitigation, more efforts have to be made for better communication with the public.

* 1. ***Climate and Agricultural Meteorological Services***

(1) Fifty-nine per cent of Members have increased the number of climatological stations and the number of climate variables measured and processed.

(2) Eighty-eight per cent of Members explicitly provided monthly and/or seasonal climate predictions, which has been a significant increase by 22 per cent since the last survey due to the active contribution of Regional Climate Centres (RCCs) and Regional Climate Outlook Forum (RCOF).

(3) Almost all Members responded that they rescued and digitized climate records (Table 3).

(4) Sixty-six per cent of Members provided agrometeorological information, forecasts and agrometeorological services to user community by promoting practical applications of technological advances. Fifty-nine per cent of Members had monitoring and warning systems for drought (Table 3).

***Table 3.*** *Percentage of Members answered ‘yes’ to the questions regarding (a) climate and (b) agricultural meteorological services*

*(a)*

|  |  |  |
| --- | --- | --- |
| **Questions** | **2011 (%)** | **2016 (%)** |
| VI-1. Increases the number of climatological stations and the number of climate variables measured and processed | 47 | 59 |
| VI-2. Increases the issuance of climatological statistics and indices and make them easily available and delivered to users | 87 | 81 |
| VI-4. Provides monthly/seasonal climate prediction | 66 | 88 |
| VI-11. Rescues and digitizes climate records | 90 | 97 |

*(b)*

|  |  |  |
| --- | --- | --- |
| **Questions** | **2011 (%)** | **2016 (%)** |
| VII-1. Provides agrometeorological information and forecasts to users | 77 | 66 |
| VII-2. Provides agrometeorological services to the user community by promoting practical applications of technological advances | 57 | 66 |
| VII-3. Has monitoring and warning systems for drought | 49 | 59 |

* 1. ***Aeronautical and Marine Meteorological Services***

(1) Ninety-one per cent of Members were designated as the meteorological authority for aviation services and provided flight documentation to airlines with 88 per cent.

(2) The number of Members implementing cost-recovery of services increased from 38 per cent to 44 per cent. Sixty-nine per cent of Members implemented quality management systems meeting ICAO and WMO standards.

(3) The number of Members implementing requirements for personnel by meeting competency increased from 55 per cent to 84 per cent and the number of Members implementing requirements for meeting education and training increased from 52 per cent to 63 per cent. This is considered as a result of cooperation between WMO and ICAO, and Members’ efforts to achieve compliance with the ICAO and WMO standards on Quality Management and competency for aeronautical meteorological personnel (Table 4).

***Table 4.*** *Percentage of Members answered ‘yes’ to the questions regarding aeronautical meteorological services*

|  |  |  |
| --- | --- | --- |
| **Questions** | **2011 (%)** | **2016 (%)** |
| VIII-2. Meteorological authority designated | 88 | 91 |
| VIII-8. Provides flight documentation to airlines | 88 | 88 |
| VIII-9. Cost-recovery of aeronautical meteorological services implemented | 38 | 44 |
| VIII-10. Has in place a quality management system meeting international standards | 41 | 69 |
| VIII-11. Implements WMO-No. 258 requirements for aeronautical meteorological personnel by meeting competency requirements (current deadline is late 2013) | 55 | Fully:50  Partially: 34 |
| VIII-12. Implements WMO-No. 258 requirements for aeronautical meteorological personnel by meeting education and training requirements (current deadline is late 2016) | 52 | 63 |

(4) Seventy-five per cent of Members issued marine forecasts/warnings for coastal waters including sea state and wave/swell. On the other hand, 59 per cent of Members issued marine forecasts/warnings for high seas and 63 per cent of Members issued storm surge warnings.

* 1. ***Hydrological forecasts and assessments***

1. Some of the questionnaires on this topic are incomplete since the hydrological forecast services are not provided by the national meteorological services in several members. In this regard, the interpretation of the results is limited. The percentage provided in Annex II (X) is based on the total number of responses received for individual questionnaires, not the total number of 33.
2. Seventy-six per cent of Members expanded the spatial and temporal coverage of hydrological observation networks and 88 per cent of Members provided services on flood and flash flood warnings. 79 per cent of NMHSs made the efforts for the improvements of adaptation capacity of water resources system in a changing climate.
3. Eighty-seven per cent of Members improved the capacity for water-related disaster management.
   1. ***Public Weather Services and Partnership***

(1) Ninety-one per cent of Members operated a website for real-time weather forecasts and warnings, which is quite similar compared with 90 per cent in the previous survey in 2011.

(2) Percentage of Members operating automatic telephone answering system has increased from 65 per cent to 75per cent. However, percentage of Members operating a TV weather forecast programme remained low at 38 per cent. Cooperation with other service providers in the provision of specific weather services or advice may need to be improved.

(3) Thirteen per cent of Members collected and distributed automated meteorological observations from aircraft.

(4) Fifty-nine per cent participated in and used the products of RA II pilot project “Develop Support for NMHSs in Numerical Weather Prediction”. Meanwhile, 34 per cent of Members joined the RA II pilot project “Develop Support for NMHSs in the Collection and Application of Aircraft Meteorological Data Relay Data.”

1. **Issues in LDCs in the Region**

3.1 As of May 2016, a total of eight Members in the Region is categorized as Least Developed Countries (LDCs) as given in Annex I. All LDCs in the Region responded to the survey questionnaires. The responses from LDCs were analyzed to identify capacities, gaps and needs of LDCs.

3.2 The remarkable gaps in the Region were found in the observational infrastructure of the LDCs as presented in Table 6. Five out of eight LDCs in the Region did not have qualified maintenance technicians. Six out of eight LDCs did not have operational RBSN upper-air stations.

3.3 Four out of eight also had no weather radars. Furthermore no LDCs had operational lighting location network, and only three of them had interaction with Regional Instrument Centres (RICs).

***Table 5.*** *Observational infrastructure for LDCs*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Questions** | **AFG** | **BGD** | **BTN** | **KHM** | **LAO** | **MYA** | **NPL** | **YMD** |
| II-3. Implement a real-time delivery of measured observations | yes | yes | yes | yes | yes | no | yes | yes |
| II-5. Qualified maintenance technicians | no | yes | no | no | yes | no | no | yes |
| II-9. Operational RBSN upper-air stations | 0 | 15 | 0 | 0 | 0 | 1 | 0 | 0 |
| II-13. Weather radars | 0 | 5 | 0 | 1 | 1 | 2 | 0 | 0 |
| II-17. Operational lighting location network | no | no | no | no | no | no | no | no |
| II-19. Interaction with Regional Instrument Centres (RICs) | no | yes | no | no | yes | no | no | yes |

3.4 Although four out of eight LDCs had systems for automatic data-processing and NWP, seven of them had an access to NWP products from major centres and mostly used and interpreted the NWP products in their forecasting operations as given in Table 7. Training opportunities to develop their capacity on the use of NWP products are, therefore, necessary.

3.5 Two LDCs operated nowcasting system for high impact weather warning. This showed an improvement since 2011 when no LDCs operated nowcasting system. Seven out of eight LDCs had strong links with national disaster managers.

***Table 6.*** *Data-processing and forecasting systems for LDCs*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Questions** | **AFG** | **BGD** | **BTN** | **KHM** | **LAO** | **MYA** | **NPL** | **YMD** |
| IV-4. Systems for automatic data-processing and NWP | no | no | no | yes | yes | no | yes | yes |
| IV-6. Access to NWP products from major centres | no | yes | yes | yes | yes | yes | yes | yes |
| IV-7. Interpret the NWP products in their forecasting operations | no | yes | yes | yes | yes | yes | no | yes |
| IV-8. Operates nowcasting system for high impact weather warning | no | yes | no | yes | no | no | no | no |
| V-1. Strong link with national disaster managers | yes | yes | yes | yes | yes | yes | yes | no |

3.6 Six out of eight LDCs responded to the survey were designated as the meteorological authority for aviation services, but only two of them implemented cost recovery services as given in Table 8.

3.7 The number of Members implementing quality management systems meeting ICAO and WMO standards has increased from zero to four. This shows an improvement of quality management system among LDCs through training and twinning programme.

***Table 7.*** *Aeronautical meteorological services for LDCs*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Questions** | **AFG** | **BGD** | **BTN** | **KHM** | **LAO** | **MYA** | **NPL** | **YMD** |
| VIII-2. Designated as the meteorological authority for aviation services | no | yes | yes | no | yes | yes | yes | yes |
| VIII-9. Cost-recovery of aeronautical meteorological services implemented | no | no | no | no | yes | yes | no | no |
| VIII-10. Has in place a quality management system meeting ICAO and WMO standards | yes | yes | no | no | yes | yes | no | no |

1. **Consideration of Regional needs and priorities**

4.1 The results of 2016 survey indicate steady improvement of weather, climate and water services by Members in RA II, but also show the gaps among Members.

4.2 In general, operational observation networks in the Region have been well maintained or enhanced. However there is also a serious concern that observational infrastructure, such as weather radar, wind profiler and lightning detection networks to detect severe weather phenomena, is far from sufficient in some Members to produce and provide reliable and timely forecast and warning services.

4.3 Most Members operate NWP system and utilize NWP products from major centres in the forecasting process and implement automatic data reception, archival and data-processing. The number of Members using ensemble prediction system and consensus technique for tropical cyclone forecasting has increased significantly but some Members need to improve development, access and usage of NWP guidance material as underlying support to prepare skillful, location-specific weather forecast for improving service delivery.

4.4 The use of a nowcasting system for high impact weather warning has not yet been applied in many Members. The use of a nowcasting system for high impact weather warning should be more enhanced urgently with the highest priority, while further improvement of capability of automatic data processing should be one of priority areas in the Region.

4.5 There has been a significant increase in the number of Members explicitly providing monthly and/or seasonal climate predictions. It is required to strengthen climate services for improved services including climate change, variability and prediction.

4.6 It is also found in many LDCs that they cannot afford to have qualified maintenance technicians for observation instruments and communication infrastructure for real-time delivery of observations. Overall however, there has been an improvement in aeronautical meteorological services in LDCs. The number of Members implementing cost-recovery of services and quality management systems has grown due to improvement of quality management system through training and twinning programmes.

**Annex I Participating Members in the Survey**

|  |  |  |
| --- | --- | --- |
| **No.** | **Member** | **2016** |
| 1 | Afghanistan\* |  |
| 2 | Bahrain |  |
| 3 | Bangladesh\* |  |
| 4 | Bhutan\* |  |
| 5 | Cambodia\* |  |
| 6 | China |  |
| 7 | Democratic People’s Republic of Korea | X |
| 8 | Hong Kong, China |  |
| 9 | India |  |
| 10 | Iran, Islamic Republic of |  |
| 11 | Iraq |  |
| 12 | Japan |  |
| 13 | Kazakhstan |  |
| 14 | Kyrgyzstan |  |
| 15 | Kuwait |  |
| 16 | Lao People's Democratic Republic\* |  |
| 17 | Macao, China |  |
| 18 | Maldives |  |
| 19 | Mongolia |  |
| 20 | Myanmar\* |  |
| 21 | Nepal\* |  |
| 22 | Oman |  |
| 23 | Pakistan |  |
| 24 | Qatar |  |
| 25 | Republic of Korea |  |
| 26 | Russian Federation |  |
| 27 | Saudi Arabia |  |
| 28 | Sri Lanka |  |
| 29 | Tajikistan |  |
| 30 | Thailand |  |
| 31 | Turkmenistan | X |
| 32 | United Arab Emirates |  |
| 33 | Uzbekistan |  |
| 34 | Vietnam |  |
| 35 | Yemen\* |  |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\* Least Developed Countries

X No response

**Annex II Survey Questionnaire and Results**

|  |  |
| --- | --- |
| **I. Management** | **(%)** |
| 1. Legal basis for provision of meteorological services (Yes/No) | 82 |
| 2. Cost-recovery for services implemented (Yes/No) | 48 |
| 3. Has access to the outline to formulate capacity assessment and development plan (as part of a national strategic plan for the enhanced provision of weather, climate and water services) (Yes/No) | 82 |
| 4. Maintains highly-qualified staff with specialized training (Yes/No) | 82 |
| 5. Has a structured training plan for professional, technical and supporting staff (Yes/No) | 85 |
| 6. Has access to and uses e-learning materials (Yes/No) | 73 |
| 7. Staff acquire professional certification in respect of WMO’s latest personnel classification scheme (Yes/No) | 70 |
| 8. Engages in continuous education programmes and refresher courses for staff as well as management training for mid- and high-level personnel (Yes/No) | 85 |
| 9. Cooperates with academia (Yes/No) | 91 |
| 10. Cooperates with media (Yes/No) | 97 |
| 11. Cooperates with private sector (Yes/No) | 88 |

|  |  |
| --- | --- |
| **II. Observing systems** | **(%)** |
| 1. Carries out regular maintenance and calibration of observation instruments (Yes/No) | 84 |
| 2. Implements reliability measures on quality management routines and procedures of weather observations (Yes/No) | 88 |
| 3. Implements real-time delivery of measured observations at remote stations (Yes/No) | 91 |
| 4. Enhances the temporal and spatial coverage of weather measurements (Yes/No) | 88 |
| 5. Has qualified maintenance technicians (Yes/No) | 75 |
| 6. Number of operational Regional Basic Synoptic Network (RBSN) surface stations\* | 2024 |
| 7. Number of automatic weather stations (AWSs)\* | 62031 |
| 8. Number of rainfall stations\* | 24990 |
| 9. Number of operational RBSN upper-air stations\* | 322 |
| 10. Number of operational Regional Basic Climatological Network (RBCN) stations\* | 1229 |
| 11. Number of operational GCOS surface stations\* | 818 |
| 12. Number of operational GCOS upper-air stations\* | 85 |
| 13. Number of operational weather radar stations\* | 378 |
| 14. Operates ground station(s) to receive high-resolution images from geostationary meteorological satellites (Yes/No) | 88 |
| 15. Operates ground station(s) to receive high-resolution images from polar-orbiting meteorological satellites (Yes/No) | 53 |
| 16. Number of operational wind profiler stations\* | 176 |
| 17. Operates a lightning location network (Yes/No) | 25 |
| 18. Number of Global Atmospheric Watch (GAW) stations\* | 87 |
| 19. Ensures the accuracy of the instruments by using the service of Regional Instrument Centre (RIC) (Yes/No) | 63 |
| 20. Ensures the accuracy of the instruments by using the service of national standards laboratory/institution (Yes/No) | 66 |
| 21. Number of AWSs on green technology for sustainable development\* | 59016 |

|  |  |
| --- | --- |
| **III. Telecommunications** | **(%)** |
| 1. Speed of GTS connection to Regional Telecommunication Hub(s) (Specify the highest speed among all circuits, in bps; No for no connection) | - |
| 2. Connected to Internet by broadband (Yes/No) | 94 |
| 3. Connected to Internet by telephone dial-up (Yes/No) | 16 |
| 4. Still runs radiofacsimile broadcast of meteorological and oceanographic information, i.e., not shifted to more economical modern communication means (Yes/No) | 16 |
| 5. Implements WMO Information System (WIS) (Yes/No) | 78 |
| 6. Benefits from WIS in terms of data and products exchange (Yes/No) | 72 |

|  |  |
| --- | --- |
| **IV. Data-processing and forecasting systems** | **(%)** |
| 1. Speed of the fastest computer system (GFLOPS) | - |
| 2. Automatic data reception and archival (Yes/No) | 81 |
| 3. Automatic data plotting (Yes/No) | 75 |
| 4. Automatic data-processing (Yes/No) | 78 |
| 5. Runs NWP model(s) operationally (Yes/No) | 84 |
| 6. Has access to NWP products from major centres operationally (Yes/No) | 94 |
| 7. Uses and interprets comprehensive NWP products in forecasting operations (Yes/No) | 94 |
| 8. Operates a nowcasting system for high impact weather warning (Yes/No) | 47 |
| 9. Increases the accuracy, timeliness and usefulness of tropical cyclone forecasts and warnings (Yes/No) | 63 |
| 10. Extends the use of EPS and consensus technique for tropical cyclone forecasting (Yes/No) | 53 |
| 11. Put in practice the principle of free and unrestricted international exchange of data and products among Members (Yes/No) | 75 |

|  |  |
| --- | --- |
| **V. Natural disaster prevention and mitigation** | **(%)** |
| 1. Links with national disaster managers (Yes/No) | 94 |
| 2. Has a public education programme (Yes/No) | 63 |

|  |  |
| --- | --- |
| **VI. Climate, climate change and climate variability** | **(%)** |
| 1. Increases the number of climatological stations and the number of climate variables measured and processed (Yes/No) | 59 |
| 2. Increases the issuance of climatological statistics and indices and make them easily available and delivered to users (Yes/No) | 81 |
| 3. Increases the number of users receiving climatological products periodically (Yes/No) | 75 |
| 4. Provides monthly/seasonal climate prediction (Yes/No) | 88 |
| 5. Makes observations to monitor climate change and climate variability (Yes/No) | 72 |
| 6. Provides meteorological and climatological information for the sustainable use and conservation of natural resources (Yes/No) | 88 |
| 7. Makes marine observations and provides data to support global and regional climate studies (Yes/No) | 44 |
| 8. Maintains metadata records for observation stations (Yes/No) | 81 |
| 9. Adopts innovative agrometeorological adaptation strategies in face of climate variability and climate change (Yes/No) | 47 |
| 10. Participates in regional or sub-regional climate research (Yes/No) | 75 |
| 11. Rescues and digitizes climate records (Yes/No) | 97 |

|  |  |
| --- | --- |
| **VII. Agricultural meteorological services** | **(%)** |
| 1. Provides agrometeorological information and forecasts to users (Yes/No) | 66 |
| 2. Provides agrometeorological services to the user community by promoting practical applications of technological advances (Yes/No) | 66 |
| 3. Has monitoring and warning systems for drought (Yes/No) | 59 |
| 4. Operates early warning system for frost formation (Yes/No) | 59 |
| 5. Operates early warning system for heat waves (Yes/No) | 63 |

|  |  |
| --- | --- |
| **VIII. Aeronautical meteorological services** | **(%)** |
| 1. Be aeronautical meteorological service provider (AEMSP) (Yes/No) | 81 |
| 2. Meteorological authority designated (Yes/No) | 91 |
| 3. Fully equipped to make and transmit aerodrome meteorological observations (Yes/No) | 75 |
| 4. Issues TAF operationally (Yes/No) | 84 |
| 5. Issues SIGMET operationally (Yes/No) | 75 |
| 6. Receives OPMET data operationally (Yes/No) | 81 |
| 7. Receives WAFS products operationally through other channels (Yes/No) | 81 |
| 8. Provides flight documentation to airlines (Yes/No) | 88 |
| 9. Cost-recovery of aeronautical meteorological services implemented (Yes/No) | 44 |
| 10. Has in place a quality management system meeting international standards (Yes/No) | 69 |
| 11. Implements WMO-No. 258 requirements for aeronautical meteorological personnel by meeting competency requirements (current deadline is late 2013) (Fully/Partially/No) | Fully:50  Partially: 34 |
| 12. Implements WMO-No. 258 requirements for aeronautical meteorological personnel by meeting education and training requirements (current deadline is late 2016) (Yes/No) | 66 |
| 13. Verifies aviation forecasts (including TAF) and warnings using a WMO-approved set of methods (Yes/No) | 59 |
| 14. Obtains feedback from aviation users through opinion surveys, user groups, etc. (Yes/No) | 66 |

|  |  |
| --- | --- |
| **IX. Marine meteorological services and oceanography** | **(%)** |
| 1. Number of operational tide gauges\* | 619 |
| 2. Number of operational drifting and moored buoys\* | 257 |
| 3. Number of voluntary observing ships (VOS) for meteorological, oceanographic and/or upper-air observations\* | 981 |
| 4. Issues marine forecasts/warnings for coastal waters including sea state and wave/swell (Yes/No) | 75 |
| 5. Issues marine forecasts/warnings for high seas (Yes/No) | 59 |
| 6. Issues storm surge warnings (Yes/No) | 63 |
| 7. Runs storm surge model(s) operationally (Yes/No) | 38 |
| 8. Provides support for combating marine pollution (Yes/No) | 53 |
| 9. Provides support for search and rescue (Yes/No) | 66 |
| 10. Number of systems implemented for real-time monitoring of storm surge or tsunami\* | 51 |
| 11. Obtains feedback from marine users through opinion surveys, user groups, etc. (Yes/No) | 41 |

|  |  |
| --- | --- |
| **X. Hydrological forecasts and assessments** | **(%)** |
| 1. Expands the spatial and temporal coverage of hydrological observation networks (Yes/No/Not applicable) | 76 |
| 2. Implements reliability measures for maintenance procedures for measurement and equipment in hydrological stations and for quality control procedures applied on data collected from hydrological stations (Yes/No/Not applicable) | 77 |
| 3. Calculates runoff with quality and accuracy (Yes/No/Not applicable) | 68 |
| 4. Measures changes in river flow in snow/glacier-fed rivers (Yes/No/Not applicable) | 55 |
| 5. Issues flood and flash flood warnings and constantly improves upon them (Yes/No/Not applicable) | 88 |
| 6. Issues landslide/debris flow warnings and constantly improves upon them (Yes/No/Not applicable) | 57 |
| 7. Improves hydrological warnings capability through enhanced and effective cooperation with other NMHSs (Yes/No/Not applicable) | 67 |
| 8. Enhances the preparedness to predict and manage hydrological droughts and the knowledge for decision-making (Yes/No/Not applicable) | 68 |
| 9. Improves the adaptation capacity of water resources systems in a changing climate (Yes/No/Not applicable) | 79 |
| 10. Improves the capacity for water-related disaster management (Yes/No/Not applicable) | 87 |
| **XI. Public weather services** | **(%)** |
| 1. Provides nowcasting of high impact weather (0-6 hours ahead) (Yes/No) | 78 |
| 2. Issues short-range weather forecasts/warnings (6-24 hours ahead) (Yes/No) | 100 |
| 3. Issues medium-range weather forecasts/warnings (1 day – 2 weeks ahead) (Yes/No) | 84 |
| 4. Range of public weather forecasts (Days) | - |
| 5. Operates a Website for real-time weather information, forecasts and warnings (Yes/No) | 91 |
| 6. Operates and updates a website for the delivery and display of services and products (Yes/No) | 91 |
| 7. Operates an automatic telephone answering system for weather information, forecasts and warnings (Yes/No) | 75 |
| 8. Operates a TV weather programme (Yes/No) | 38 |
| 9. Verifies public forecasts accuracy (Yes/No) | 72 |
| 10. Obtains feedback from users through opinion surveys, user groups, etc. (Yes/No) | 66 |

|  |  |
| --- | --- |
| **XII. Partnership** | **(%)** |
| 1. Collects and distributes automated meteorological observations from aircraft (Yes/No) | 13 |
| 2. Number of automated meteorological observations from aircraft generated per year\* | 11303280 |
| 3. Engages in health-related studies in association with partner organizations (Yes/No) | 56 |
| 4. Engages in socio-economic studies demonstrating the benefits of meteorological, climatological and hydrological infrastructure, information, products and services (Yes/No) | 63 |
| 5. Contributes operational weather information to WMO’s on-line World Weather Information Service (WWIS) (Yes/No) | 75 |
| 6. Number of cities for which weather forecasts are on WWIS\* | 482 |
| 7. Supports the exchange of official warnings of severe weather by contributing to WMO’s on-line Severe Weather Information Centre (SWIC) (Yes/No) | 44 |
| 8. Joins the RA II Pilot Project to Develop Support for NMHSs in Numerical Weather Prediction (Yes/No) | 59 |
| 9. Joins the RA II Pilot Project on Information Sharing on Climate Services (Yes/No) | 50 |
| 10. Joins the RA II Pilot Project to Develop Support for NMHSs in the Collection and Application of Aircraft Meteorological Data Relay Data (Yes/No) | 34 |
| 11. Joins the RA II Pilot Project to Sustain and Enhance the Capacity of NMHSs in the Provision of Official Weather Forecasts for Medium Range (Yes/No) | 56 |
| 12. Joins the RA II Pilot Project to Enhance the Seamless Provision of Regional Severe Weather Warnings and Advisories (Yes/No) | 50 |

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\* Total number

**Annex III Survey Responses**

**I. MANAGEMENT** (YES/NO)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** |
| **AFG** | O | X | O | O | O | X | X | O | O | O | O |
| **BHR** | O | O | O | O | O | O | O | O | O | O | O |
| **BGD** | X | X | X | X | O | O | X | X | O | O | X |
| **BTN** | O | X | O | X | X | X | X | X | X | O | X |
| **KHM** | O | X | O | O | O | X | O | O | O | O | O |
| **CHN** | O | O | O | O | O | O | O | O | O | O | O |
| **HKG** | X | O | O | O | O | O | O | O | O | O | O |
| **IND** | O | X | O | O | O | O | O | O | O | O | O |
| **IRN** | O | X | O | O | O | O | O | O | O | O | O |
| **IRQ** | O | X | O | O | O | X | O | O | O | O | O |
| **JPN** | O | X | O | O | O | X | X | O | O | O | O |
| **KAZ** | O | O | O | O | O | X | X | O | O | O | O |
| **KWT** | X | O | X | O | O | O | O | O | O | O | O |
| **KGZ** | O | O | O | O | O | O | O | O | O | O | O |
| **LAO** | O | O | O | O | O | O | O | O | O | O | O |
| **MAC** | O | X | O | O | O | O | O | X | O | X | X |
| **MDV** | X | X | O | X | X | O | X | X | X | O | O |
| **MNG** | O | O | O | O | O | O | O | O | O | O | O |
| **MYA** | O | X | O | X | O | X | O | O | O | O | O |
| **NPL** | X | X | X | X | X | O | X | O | O | O | X |
| **OMN** | O | O | O | O | O | O | O | O | O | O | O |
| **PAK** | O | O | O | O | O | O | O | O | O | O | O |
| **QAT** | O | O | O | O | O | O | O | O | O | O | O |
| **KOR** | O | X | O | O | O | O | O | O | O | O | O |
| **RUS** | O | O | O | O | O | O | X | O | O | O | O |
| **SAU** | O | X | O | X | O | X | O | O | O | O | O |
| **LKA** | O | X | X | O | X | O | O | O | X | O | O |
| **TJK** | O | O | O | O | X | O | X | O | O | O | O |
| **THA** | O | X | O | O | O | O | O | O | O | O | O |
| **UAE** | O | O | O | O | O | X | O | X | O | O | O |
| **UZB** | O | O | X | O | O | O | O | O | O | O | O |
| **VNM** | O | O | O | O | O | O | O | O | O | O | O |
| **YMD** | X | X | X | O | O | O | X | O | O | O | O |

**QUESTIONS**

1. Legal basis for provision of meteorological services (Yes/No)

2. Cost-recovery for services implemented (Yes/No)

3. Has access to the outline to formulate capacity assessment and development plan (as part of a national strategic plan for the enhanced provision of weather, climate and water services) (Yes/No)

4. Maintains highly-qualified staff with specialized training (Yes/No)

5. Has a structured training plan for professional, technical and supporting staff (Yes/No)

6. Has access to and uses e-learning materials (Yes/No)

7. Staff acquire professional certification in respect of WMO’s latest personnel classification scheme (Yes/No)

8. Engages in continuous education programmes and refresher courses for staff as well as management training for mid- and high-level personnel (Yes/No)

9. Cooperates with academia (Yes/No)

10. Cooperates with media (Yes/No)

11. Cooperates with private sector (Yes/No)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X

**II. (a) OBSERVING SYSTEMS** (YES/NO)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** | **14** | **15** | **17** | **19** | **20** |
| **AFG** | X | O | O | X | X | X | X | X | X | X |
| **BHR** | O | O | O | O | O | O | X | X | O | X |
| **BGD** | O | O | O | X | O | O | X | X | O | O |
| **BTN** | O | X | O | O | X | O | X | X | X | X |
| **KHM** | O | X | O | O | X | O | X | X | X | X |
| **CHN** | O | O | O | O | O | O | O | O | O | O |
| **HKG** | O | O | O | O | O | O | O | O | O | O |
| **IND** | O | O | X | O | O | O | O | X | O | O |
| **IRN** | O | O | O | O | O | O | O | X | O | O |
| **IRQ** | O | O | O | O | O | X | O | X | O | O |
| **JPN** | O | O | O | O | O | O | O | O | O | O |
| **KAZ** | O | O | O | O | O | X | X | X | X | O |
| **KWT** | O | O | O | O | O | O | O | X | X | X |
| **KGZ** | X | O | O | O | O | O | O | X | X | O |
| **LAO** | O | O | O | O | O | O | X | X | O | O |
| **MAC** | O | O | O | O | X | O | X | O | X | X |
| **MDV** | X | O | O | O | X | O | X | X | X | X |
| **MNG** | O | O | O | O | O | O | O | X | O | O |
| **MYA** | X | O | X | X | X | O | X | X | X | O |
| **NPL** | X | X | O | O | X | X | X | X | X | X |
| **OMN** | O | O | O | O | O | O | O | O | O | O |
| **PAK** | O | O | O | O | O | O | X | X | X | X |
| **QAT** | O | O | O | O | O | O | O | X | O | O |
| **KOR** | O | O | O | O | O | O | O | O | O | O |
| **RUS** | O | O | O | O | O | O | O | O | O | O |
| **SAU** | O | O | O | O | O | O | O | X | O | X |
| **LKA** | O | O | O | O | O | O | X | X | O | X |
| **TJK** |  |  |  |  |  |  |  |  |  |  |
| **THA** | O | O | O | O | O | O | O | O | O | O |
| **UAE** | O | O | O | O | O | O | O | X | O | O |
| **UZB** | O | X | O | O | O | O | O | X | X | O |
| **VNM** | O | O | X | O | X | O | X | X | O | O |
| **YMD** | O | O | O | X | O | O | X | X | O | O |

**QUESTIONS**

1. Carries out regular maintenance and calibration of observation instruments (Yes/No)

2. Implements reliability measures on quality management routines and procedures of weather observations (Yes/No)

3. Implements real-time delivery of measured observations at remote stations (Yes/No)

4. Enhances the temporal and spatial coverage of weather measurements (Yes/No)

5. Has qualified maintenance technicians (Yes/No)

14. Operates ground station(s) to receive high-resolution images from geostationary meteorological satellites (Yes/No)

15. Operates ground station(s) to receive high-resolution images from polar-orbiting meteorological satellites (Yes/No)

17. Operates a lightning location network (Yes/No)

19. Ensures the accuracy of the instruments by using the service of Regional Instrument Centre (RIC) (Yes/No)

20. Ensures the accuracy of the instruments by using the service of national standards laboratory/institution (Yes/No)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X

**II. (b) OBSERVING SYSTEMS** (NUMBERS)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **16** | **18** | **21** |
| **AFG** | 21 | 5 | 26 | 0 | 26 | 0 | 0 | 0 | 26 | 0 | 0 |
| **BHR** | 1 | 4 | 5 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| **BGD** | 42 | 32 | 58 | 15 | 10 | 10 | 4 | 5 | 0 | 0 | 0 |
| **BTN** | 1 | 22 | 80 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| **KHM** | 0 | 35 | 105 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| **CHN** | 220 | 57427 | 15658 | 88 | 81 | 32 | 7 | 190 | 31 | 4 | 57427 |
| **HKG** | 1 | 120 | 180 | 1 | 1 | 0 | 1 | 5 | 4 | 2 | 50 |
| **IND** | 89 | 679 | 1350 | 44 | 66 | 21 | 6 | 24 | 0 | 10 | 679 |
| **IRN** | 77 | 325 | 2450 | 10 | 13 | 7 | 1 | 9 | 1 | 1 | 445 |
| **IRQ** | 49 | 8 | 15 | 2 | 1 | 0 | 0 | 2 | 0 | 0 | 3 |
| **JPN** | 52 | 931 | 373 | 16 | 52 | 13 | 6 | 20 | 33 | 6 | 0 |
| **KAZ** | 66 | 132 | 328 | 9 | 44 | 13 | 9 | 1 | 0 | 0 | 21 |
| **KWT** | 8 | 28 | 22 | 1 | 28 | 28 | 28 | 1 | 28 | 0 | 0 |
| **KGZ** | 28 | 24 | 28 | 1 | 28 | 28 | 1 | 0 | 28 | 1 | 24 |
| **LAO** | 22 | 44 | 119 | 0 | 27 | 0 | 0 | 1 | 0 | 0 | 44 |
| **MAC** | 1 | 15 | 15 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 0 |
| **MDV** | 5 | 18 | 7 | 1 | 5 | 5 | 1 | 1 | 0 | 5 | 0 |
| **MNG** | 135 | 140 | 316 | 4 | 316 | 316 | 4 | 1 | 0 | 1 | 10 |
| **MYA** | 51 | 47 | 120 | 1 | 5 | 4 | 0 | 2 | 0 | 0 | 47 |
| **NPL** | 15 | 20 | 400 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **OMN** | 70 | 70 | 70 | 2 | 70 | 70 | 2 | 4 | 2 | 0 | 0 |
| **PAK** | 36 | 50 | 400 | 15 | 100 | 56 | 0 | 5 | 1 | 1 | 50 |
| **QAT** | 1 | 19 | 44 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 40 |
| **KOR** | 44 | 585 | 585 | 5 | 11 | 3 | 1 | 10 | 9 | 6 | 0 |
| **RUS** | 579 | 300 | - | 78 | 183 | 109 | 10 | 38 | 0 | 48 | 150 |
| **SAU** | 28 | 155 | 375 | 8 | 34 | 6 | 1 | 12 | 1 | 0 | 16 |
| **LKA** | 23 | 38 | 450 | 4 | 17 | 5 | 0 | 0 | 0 | 0 | 0 |
| **TJK** |  |  |  |  |  |  |  |  |  |  |  |
| **THA** | 87 | 91 | 979 | 11 | 13 | 6 | 2 | 26 | 1 | 2 | 0 |
| **UAE** | 6 | 50 | 30 | 1 | 3 | 2 | 0 | 5 | 0 | 0 | 4 |
| **UZB** | 66 | 11 | 81 | 0 | 21 | 81 | 0 | 3 | 0 | 0 | 0 |
| **VNM** | 180 | 600 | 300 | 4 | 51 | 0 | 0 | 8 | 7 | 0 | 0 |
| **YMD** | 20 | 6 | 21 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 6 |

**QUESTIONS**

6. Number of operational Regional Basic Synoptic Network (RBSN) surface stations

7. Number of automatic weather stations (AWSs)

8. Number of rainfall stations

9. Number of operational RBSN upper-air stations\*

10. Number of operational Regional Basic Climatological Network (RBCN) stations

11. Number of operational GCOS surface stations

12. Number of operational GCOS upper-air stations

13. Number of operational weather radar stations

16. Number of operational wind profiler stations

18. Number of Global Atmospheric Watch (GAW) stations

21. Number of AWSs on green technology for sustainable development

**III. (a) TELECOMMUNICATION** (YES/NO)

**III. (b) TELECOMMUNICATION** (NUMBERS)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2** | **3** | **4** | **5** | **6** |  |  | **1** |
| **AFG** | O | X | O | O | X | **AFG** | No |
| **BHR** | O | X | X | O | X | **BHR** | 9600 |
| **BGD** | O | X | X | X | X | **BGD** | 64K |
| **BTN** | O | X | O | O | O | **BTN** | 1M |
| **KHM** | O | X | X | O | X | **KHM** | 2M |
| **CHN** | O | X | X | O | O | **CHN** | 16M |
| **HKG** | O | X | X | O | O | **HKG** | 4M |
| **IND** | O | X | X | O | O | **IND** | 1G |
| **IRN** | O | X | X | O | O | **IRN** | 50M |
| **IRQ** | O | X | X | X | X | **IRQ** | No |
| **JPN** | O | X | O | O | O | **JPN** | 10M |
| **KAZ** | O | O | O | X | X | **KAZ** | 64K |
| **KWT** | X | X | X | O | O | **KWT** | 64K |
| **KGZ** | X | X | X | X | O | **KGZ** | 5M |
| **LAO** | O | X | X | O | O | **LAO** | 128K |
| **MAC** | O | X | X | O | O | **MAC** | 2M |
| **MDV** | O | X | X | O | O | **MDV** | 10M |
| **MNG** | O | O | X | X | X | **MNG** | 64K |
| **MYA** | O | X | X | O | O | **MYA** | 2M |
| **NPL** | O | O | X | X | X | **NPL** | 3M |
| **OMN** | O | X | X | O | X | **OMN** | 64K |
| **PAK** | O | O | X | O | O | **PAK** | 128K |
| **QAT** | O | X | X | O | O | **QAT** | 16K |
| **KOR** | O | X | X | O | O | **KOR** | 4M |
| **RUS** | O | X | X | O | O | **RUS** | ---- |
| **SAU** | O | X | X | O | O | **SAU** | 2M |
| **LKA** | O | X | X | X | O | **LKA** | 256K |
| **TJK** |  |  |  |  |  | **TJK** |  |
| **THA** | O | X | O | O | O | **THA** | 128K |
| **UAE** | O | X | X | O | O | **UAE** | 32M |
| **UZB** | O | X | X | O | O | **UZB** | 64K |
| **VNM** | O | X | X | O | O | **VNM** | 64K |
| **YMD** | O | O | X | O | O | **YMD** | 256K |

**QUESTION**

1. Speed of GTS connection to Regional Telecommunication Hub(s) (Specify the highest speed among all circuits, in bps; No for no connection)

**QUESTIONS**

2. Connected to Internet by broadband (Yes/No)

3. Connected to Internet by telephone dial-up (Yes/No)

4. Still runs radiofacsimile broadcast of meteorological and oceanographic information, i.e., not shifted to more economical modern communication means (Yes/No)

5. Implements WMO Information System (WIS) (Yes/No)

6. Benefits from WIS in terms of data and products exchange (Yes/No)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X

**IV. (b) DATA-PROCESSING AND FORECASTING SYSTEMS** (NUMBERS)

**IV. (a) DATA-PROCESSING AND FORECASTING SYSTEMS** (YES/NO)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** |  |  | **1** |
| **AFG** | X | X | X | X | X | X | X | X | X | X | **AFG** | Core i3, 2gb ram but in near future we will have access to last generation of computers which is a part of WMO on-going project |
| **BHR** | O | O | O | O | O | O | O | O | O | O | **BHR** | 8.809 GFLOPS |
| **BGD** | X | O | X | O | O | O | O | O | O | X | **BGD** | 3.5 TFLOPS |
| **BTN** | X | X | X | O | O | O | X | X | O | O | **BTN** |  |
| **KHM** | O | X | O | X | O | O | O | O | X | X | **KHM** | 13 GFLOPS |
| **CHN** | O | O | O | O | O | O | O | O | O | O | **CHN** | 1054000 GFLOPS |
| **HKG** | O | O | O | O | O | O | O | O | O | O | **HKG** | 18700 GFLOPS |
| **IND** | O | O | O | O | O | O | O | O | O | O | **IND** | 1.2 PFLOPS |
| **IRN** | O | O | O | O | O | O | O | X | X | O | **IRN** | 14 TFLOPS |
| **IRQ** | O | O | X | X | X | O | X | X | X | X | **IRQ** |  |
| **JPN** | O | O | O | O | O | O | O | O | O | O | **JPN** | 847000 GFLOPS |
| **KAZ** | O | O | O | O | O | O | X | X | X | X | **KAZ** | 0.5 TFLOPS |
| **KWT** | O | O | O | O | O | O | X | X | X | O | **KWT** |  |
| **KGZ** | O | O | O | O | O | O | X | X | X | O | **KGZ** |  |
| **LAO** | O | X | O | X | O | O | X | O | O | O | **LAO** | 6 GFLOPS |
| **MAC** | O | O | O | O | O | O | X | O | O | X | **MAC** | 500 GFLOPS |
| **MDV** | X | O | X | O | O | O | X | X | X | O | **MDV** | 2.4 GFLOPS |
| **MNG** | O | O | O | O | O | O | O | X | X | O | **MNG** | 6300 GFLOPS |
| **MYA** | X | X | X | O | O | O | X | O | O | X | **MYA** |  |
| **NPL** | O | X | O | O | O | X | X | X | X | O | **NPL** |  |
| **OMN** | O | O | O | O | O | O | X | O | O | O | **OMN** | 9274 GFLOPS |
| **PAK** | O | O | O | O | O | O | O | O | O | O | **PAK** | 3.6 TFLOPS |
| **QAT** | O | O | O | O | O | O | O | X | X | O | **QAT** | 64 GFLOPS |
| **KOR** | O | X | O | O | O | O | O | O | O | O | **KOR** | 2,900,000 GFLOPS |
| **RUS** | O | O | O | O | O | O | O | O | X | O | **RUS** | 35000 GFLOPS |
| **SAU** | O | O | O | O | O | O | O | X | X | O | **SAU** | 2060 GFLOPS |
| **LKA** | X | O | O | O | O | O | X | O | O | X | **LKA** |  |
| **TJK** |  |  |  |  |  |  |  |  |  |  | **TJK** |  |
| **THA** | O | X | O | O | O | O | X | O | O | O | **THA** | 7.488 GFLOPS |
| **UAE** | O | O | O | O | O | O | O | O | O | O | **UAE** | 30GFLOPS |
| **UZB** | O | O | X | O | O | O | X | O | X | O | **UZB** | 411 GFLOPS |
| **VNM** | O | O | O | O | O | O | X | O | O | O | **VNM** | 2 TFLOPS -> 70 TFLOPS(2017-2018) |
| **YMD** | O | O | O | X | O | O | X | O | X | O | **YMD** | 15128 GFLOPS |

**QUESTIONS**

2. Automatic data reception and archival (Yes/No)

3. Automatic data plotting (Yes/No)

4. Automatic data-processing (Yes/No)

5. Runs NWP model(s) operationally (Yes/No)

6. Has access to NWP products from major centres operationally (Yes/No)

7. Uses and interprets comprehensive NWP products in forecasting operations (Yes/No)

8. Operates a nowcasting system for high impact weather warning (Yes/No)

9. Increases the accuracy, timeliness and usefulness of tropical cyclone forecasts and warnings (Yes/No)

10. Extends the use of EPS and consensus technique for tropical cyclone forecasting (Yes/No)

11. Put in practice the principle of free and unrestricted international exchange of data and products among Members (Yes/No)

**QUESTION**

1. Speed of the fastest computer system

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X

**V. NATURAL DISASTER PREVENTION AND MITIGATION** (YES/NO)

|  |  |  |
| --- | --- | --- |
|  | **1** | **2** |
| **AFG** | O | X |
| **BHR** | O | O |
| **BGD** | O | O |
| **BTN** | O | O |
| **KHM** | O | X |
| **CHN** | O | O |
| **HKG** | O | O |
| **IND** | O | O |
| **IRN** | O | O |
| **IRQ** | O | O |
| **JPN** | O | O |
| **KAZ** | O | X |
| **KWT** | X | X |
| **KGZ** | O | O |
| **LAO** | O | X |
| **MAC** | O | O |
| **MDV** | O | O |
| **MNG** | O | X |
| **MYA** | O | O |
| **NPL** | O | X |
| **OMN** | O | O |
| **PAK** | O | O |
| **QAT** | O | O |
| **KOR** | O | O |
| **RUS** | O | X |
| **SAU** | O | X |
| **LKA** | O | O |
| **TJK** |  |  |
| **THA** | O | O |
| **UAE** | O | X |
| **UZB** | O | O |
| **VNM** | O | X |
| **YMD** | X | X |

**QUESTIONS**

1. Links with national disaster managers (Yes/No)

2. Has a public education programme (Yes/No)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X

**VI. CLIMATE, CLIMATE CHANGE AND CLIMATE VARIABILITY** (YES/NO)

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** |
| **AFG** | X | O | X | O | X | O | X | O | X | O | O |
| **BHR** | X | O | O | O | O | O | X | O | X | O | O |
| **BGD** | O | O | O | O | X | O | X | O | X | O | O |
| **BTN** | O | O | X | O | X | O | X | X | X | X | O |
| **KHM** | X | X | X | O | X | O | X | O | X | X | O |
| **CHN** | O | O | O | O | O | O | O | O | O | O | O |
| **HKG** | O | O | O | O | O | O | O | O | O | O | O |
| **IND** | O | O | O | O | O | O | O | O | O | O | O |
| **IRN** | O | O | O | O | O | O | O | O | O | O | O |
| **IRQ** | O | X | O | O | O | O | X | O | X | X | O |
| **JPN** | X | O | O | O | O | O | O | O | X | O | O |
| **KAZ** | X | X | O | O | O | X | O | O | X | O | O |
| **KWT** | O | O | O | O | O | O | O | O | O | O | O |
| **KGZ** | O | X | X | X | O | O | X | X | X | O | O |
| **LAO** | O | O | O | O | X | O | X | O | O | X | O |
| **MAC** | X | X | X | O | O | X | X | O | X | O | O |
| **MDV** | X | O | O | O | O | O | X | O | X | X | O |
| **MNG** | X | X | X | O | O | X | X | O | O | O | O |
| **MYA** | O | O | O | O | O | O | X | O | O | O | O |
| **NPL** | O | O | O | O | O | O | X | X | X | O | O |
| **OMN** | O | O | O | X | X | O | O | O | X | X | O |
| **PAK** | O | O | O | O | O | O | O | O | O | O | O |
| **QAT** | O | O | O | O | O | O | O | O | X | O | O |
| **KOR** | X | O | O | O | O | X | O | O | O | O | O |
| **RUS** | X | O | O | O | O | O | O | O | O | O | O |
| **SAU** | X | O | X | O | X | O | X | X | X | O | O |
| **LKA** | O | O | O | O | O | O | X | O | O | O | O |
| **TJK** |  |  |  |  |  |  |  |  |  |  |  |
| **THA** | X | O | O | O | O | O | O | O | O | O | O |
| **UAE** | O | O | O | X | X | O | O | X | X | X | O |
| **UZB** | X | O | O | O | O | O | X | X | O | O | O |
| **VNM** | O | O | O | O | O | O | X | O | O | O | X |
| **YMD** | O | O | X | X | X | O | X | O | X | X | O |

**QUESTIONS**

1. Increases the number of climatological stations and the number of climate variables measured and processed (Yes/No)

2. Increases the issuance of climatological statistics and indices and make them easily available and delivered to users (Yes/No)

3. Increases the number of users receiving climatological products periodically (Yes/No)

4. Provides monthly/seasonal climate prediction (Yes/No)

5. Makes observations to monitor climate change and climate variability (Yes/No)

6. Provides meteorological and climatological information for the sustainable use and conservation of natural resources (Yes/No)

7. Makes marine observations and provides data to support global and regional climate studies (Yes/No)

8. Maintains metadata records for observation stations (Yes/No)

9. Adopts innovative agrometeorological adaptation strategies in face of climate variability and climate change (Yes/No)

10. Participates in regional or sub-regional climate research (Yes/No)

11. Rescues and digitizes climate records (Yes/No)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X

**VII. AGRICULTURAL METEOROLOGICAL SERVICES** (YES/NO)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** |
| **AFG** | X | X | X | X | O |
| **BHR** | X | X | X | X | X |
| **BGD** | O | O | O | X | O |
| **BTN** | X | X | X | X | X |
| **KHM** | X | X | O | X | O |
| **CHN** | O | O | O | O | O |
| **HKG** | O | O | O | O | O |
| **IND** | O | O | O | O | O |
| **IRN** | O | O | O | O | O |
| **IRQ** | O | O | X | X | X |
| **JPN** | O | O | O | O | O |
| **KAZ** | O | O | O | O | O |
| **KWT** | O | X | O | O | O |
| **KGZ** | O | O | X | O | X |
| **LAO** | O | O | O | O | O |
| **MAC** | X | X | X | X | X |
| **MDV** | X | X | X | X | X |
| **MNG** | O | O | O | O | O |
| **MYA** | O | O | O | X | X |
| **NPL** | X | O | X | O | O |
| **OMN** | X | X | X | X | X |
| **PAK** | O | O | O | O | O |
| **QAT** | O | O | X | X | O |
| **KOR** | O | O | O | O | O |
| **RUS** | O | O | O | O | O |
| **SAU** | X | X | O | X | O |
| **LKA** | O | O | O | O | X |
| **TJK** |  |  |  |  |  |
| **THA** | O | O | O | O | X |
| **UAE** | X | X | X | X | X |
| **UZB** | O | O | X | O | X |
| **VNM** | O | O | O | O | O |
| **YMD** | X | X | X | O | O |

**QUESTIONS**

1. Provides agrometeorological information and forecasts to users (Yes/No)

2. Provides agrometeorological services to the user community by promoting practical applications of technological advances (Yes/No)

3. Has monitoring and warning systems for drought (Yes/No)

4. Operates early warning system for frost formation (Yes/No)

5. Operates early warning system for heat waves (Yes/No)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X

**VIII. AERONAUTICAL METEROLOGICAL SERVICES** (YES/NO)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| **AFG** | X | O | X | X | X | X | X | O | X | O | Partially | X | O | X |
| **BHR** | O | O | O | O | O | O | O | O | O | O | Fully | O | O | O |
| **BGD** | O | O | O | O | O | O | O | O | X | O | Partially | X | O | O |
| **BTN** | O | O | X | X | X | X | X | O | X | X | X | X | X | X |
| **KHM** | X | X | X | X | X | O | O | X | X | X | X | X | X | X |
| **CHN** | O | O | O | O | O | O | O | O | O | O | Fully | O | O | O |
| **HKG** | O | O | O | O | O | O | O | O | O | O | Fully | O | O | O |
| **IND** | O | O | O | O | O | O | O | O | O | O | Fully | O | O | O |
| **IRN** | O | O | O | O | O | O | O | O | X | O | Partially | O | O | O |
| **IRQ** | X | O | O | O | O | O | X | O | X | X | X | O | O | X |
| **JPN** | O | O | O | O | O | O | O | O | O | O | Fully | O | X | O |
| **KAZ** | X | X | X | O | X | X | X | X | X | X | X | X | X | X |
| **KWT** | O | O | O | O | O | O | O | O | O | O | Fully | O | O | X |
| **KGZ** | X | O | X | X | X | X | X | X | X | X | X | X | X | X |
| **LAO** | O | O | X | O | O | O | O | O | O | O | Fully | X | X | O |
| **MAC** | O | O | O | O | X | O | O | O | X | O | Fully | O | X | O |
| **MDV** | O | O | O | O | O | O | O | O | X | X | Partially | X | X | O |
| **MNG** | O | O | O | O | O | O | O | O | X | O | Fully | O | O | O |
| **MYA** | O | O | X | O | O | O | O | O | O | O | Partially | O | O | O |
| **NPL** | O | O | O | O | O | X | O | O | X | X | Partially | X | X | O |
| **OMN** | O | O | O | O | O | O | O | O | O | X | Partially | O | X | O |
| **PAK** | O | O | O | O | O | O | O | O | O | O | Fully | O | X | X |
| **QAT** | O | O | O | O | X | O | O | O | X | O | Partially | O | O | O |
| **KOR** | O | O | O | O | O | O | O | O | O | O | Fully | O | O | O |
| **RUS** | O | O | O | O | O | O | O | O | O | O | Fully | O | O | O |
| **SAU** | O | O | O | O | O | O | O | O | X | O | Partially | O | O | O |
| **LKA** | O | O | O | O | O | O | O | O | X | X | Fully | O | X | X |
| **TJK** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **THA** | O | O | O | O | O | O | O | O | X | O | Partially | O | O | O |
| **UAE** | O | O | O | O | O | O | O | O | O | O | Fully | O | O | O |
| **UZB** | O | O | O | O | O | O | O | O | O | O | Fully | O | O | O |
| **VNM** | X | X | X | X | X | X | X | X | X | O | Fully | X | X | X |
| **YMD** | O | O | O | O | O | O | O | O | X | X | Partially | X | O | X |

**QUESTIONS**  
1. Be aeronautical meteorological service provider (AEMSP) (Yes/No)

2. Meteorological authority designated (Yes/No)

3. Fully equipped to make and transmit aerodrome meteorological observations (Yes/No)

4. Issues TAF operationally (Yes/No)

5. Issues SIGMET operationally (Yes/No)

6. Receives OPMET data operationally (Yes/No)

7. Receives WAFS products operationally through other channels (Yes/No)

8. Provides flight documentation to airlines (Yes/No)

9. Cost-recovery of aeronautical meteorological services implemented (Yes/No)

10. Has in place a quality management system meeting international standards (Yes/No)

11. Implements WMO-No. 258 requirements for aeronautical meteorological personnel by meeting competency requirements (current deadline is late 2013) (Fully/Partially/No)

12. Implements WMO-No. 258 requirements for aeronautical meteorological personnel by meeting education and training requirements (current deadline is late 2016) (Yes/No)

13. Verifies aviation forecasts (including TAF) and warnings using a WMO-approved set of methods (Yes/No)

14. Obtains feedback from aviation users through opinion surveys, user groups, etc. (Yes/No)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X

**IX. a) MARINE METEROLOGICAL SERVICES AND OCEANOGRAPHY** (YES/NO)

**IX. (b) MARINE METEROLOGICAL SERVICES AND OCEANOGRAPHY** (NUMBERS)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **4** | **5** | **6** | **7** | **8** | **9** | **11** |  |  | **1** | **2** | **3** | **10** |
| **AFG** | X | X | X | X | X | X | X | **AFG** | 0 | 0 | 0 | 0 |
| **BHR** | O | O | X | X | X | O | O | **BHR** | 0 | 0 | 0 | 0 |
| **BGD** | O | X | O | O | X | X | X | **BGD** | 0 | 0 | 0 | 0 |
| **BTN** | X | X | X | X | X | X | X | **BTN** | 0 | 0 | 0 | 0 |
| **KHM** | O | X | O | X | X | X | X | **KHM** | 0 | 0 | 0 | 0 |
| **CHN** | O | O | O | X | O | O | O | **CHN** | 119 | 33 | 49 | 1 |
| **HKG** | O | O | O | O | O | O | O | **HKG** | 11 | 11 | 65 | 2 |
| **IND** | O | O | O | O | X | O | O | **IND** | 21 | 121 | 2 | 2 |
| **IRN** | O | O | X | X | O | O | O | **IRN** | 0 | 6 | 2 | 0 |
| **IRQ** | X | X | X | X | X | X | X | **IRQ** | 1 | 0 | 0 | 0 |
| **JPN** | O | O | O | O | O | O | O | **JPN** | 69 | 4 | 584 | 2 |
| **KAZ** | O | O | O | O | O | O | O | **KAZ** | 0 | 0 | 0 | 7 |
| **KWT** | O | O | O | X | O | O | X | **KWT** | 8 | 5 | 0 | 0 |
| **KGZ** | X | X | X | X | X | X | X | **KGZ** | 0 | 0 | 0 | 0 |
| **LAO** | X | X | X | X | X | X | X | **LAO** | 0 | 0 | 0 | 0 |
| **MAC** | O | X | O | O | X | O | X | **MAC** | 2 | 0 | 0 | 2 |
| **MDV** | O | O | O | X | O | O | X | **MDV** | 3 | 0 | 0 | 0 |
| **MNG** | X | X | X | X | X | X | X | **MNG** | 0 | 0 | 0 | 0 |
| **MYA** | O | O | O | O | X | O | O | **MYA** | 6 | 0 | 0 | 3 |
| **NPL** | X | X | X | X | X | X | X | **NPL** | 0 | 0 | 0 | 0 |
| **OMN** | O | X | O | O | O | O | X | **OMN** | 10 | 0 | 0 | 2 |
| **PAK** | O | O | O | X | O | O | X | **PAK** | 0 | 0 | 0 | 2 |
| **QAT** | O | O | O | X | O | O | O | **QAT** | 1 | 2 | 0 | 0 |
| **KOR** | O | O | O | O | O | O | O | **KOR** | 0 | 66 | 31 | 18 |
| **RUS** | O | O | O | X | O | O | X | **RUS** | 62 | 6 | 113 | 1 |
| **SAU** | O | X | X | X | O | O | O | **SAU** | 0 | 0 | 135 | 0 |
| **LKA** | O | O | O | O | O | O | X | **LKA** | 3 | 0 | 0 | 3 |
| **TJK** |  |  |  |  |  |  |  | **TJK** |  |  |  |  |
| **THA** | O | O | O | O | O | O | O | **THA** | 0 | 0 | 0 | 6 |
| **UAE** | O | O | O | X | O | O | O | **UAE** | 3 | 3 | 0 | 0 |
| **UZB** | X | X | X | X | X | X | X | **UZB** | 0 | 0 | 0 | 0 |
| **VNM** | O | O | O | O | X | X | X | **VNM** | 300 | 0 | 0 | 0 |
| **YMD** | O | O | X | X | O | O | X | **YMD** | 0 | 0 | 0 | 0 |

**QUESTIONS**

4. Issues marine forecasts/warnings for coastal waters including sea state and wave/swell (Yes/No)

5. Issues marine forecasts/warnings for high seas (Yes/No)

6. Issues storm surge warnings (Yes/No)

7. Runs storm surge model(s) operationally (Yes/No)

8. Provides support for combating marine pollution (Yes/No)

9. Provides support for search and rescue (Yes/No)

11. Obtains feedback from marine users through opinion surveys, user groups, etc. (Yes/No)

**QUESTIONS**

1. Number of operational tide gauges

2. Number of operational drifting and moored buoys

3. Number of voluntary observing ships (VOS) for meteorological, oceanographic and/or upper-air observations

10. Number of systems implemented for real-time monitoring of storm surge or tsunami

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X

**X. HYDROLOGICAL FORECASTS AND ASSESSMENTS** (YES/NO)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **AFG** | X | X | X | X | X | X | X | O | X | X |
| **BHR** | - | - | - | - | - | - | - | - | - | - |
| **BGD** | O | O | O | X | O | X | O | X | O | O |
| **BTN** | O | O | O | X | O | X | O | X | O | O |
| **KHM** | X | X | X | X | X | X | X | X | X | X |
| **CHN** | O | O | O | O | O | O | O | O | O | O |
| **HKG** | O | O | X | - | O | O | O | O | O | O |
| **IND** | O | - | - | - | - | - | O | O | O | O |
| **IRN** | O | O | O | O | O | O | O | O | O | O |
| **IRQ** | O | O | X | X | X | X | X | O | - | - |
| **JPN** | O | O | O | O | O | O | O | O | X | O |
| **KAZ** | X | X | X | X | O | O | O | O | O | O |
| **KWT** | - | - | - | - | - | - | - | - | - | - |
| **KGZ** | O | O | O | O | O | O | O | O | O | O |
| **LAO** | O | O | O | O | O | O | O | O | O | O |
| **MAC** | O | X | X | - | O | X | X | X | - | O |
| **MDV** | - | - | - | - | - | - | - | - | - | O |
| **MNG** | X | O | O | O | O | O | X | X | X | X |
| **MYA** | O | O | O | X | O | - | - | - | O | O |
| **NPL** | O | O | O | O | O | X | X | X | O | O |
| **OMN** | - | - | - | - | O | - | - | - | - | - |
| **PAK** | O | O | O | O | O | O | O | O | - | O |
| **QAT** | - | - | - | - | - | - | - | - | - | - |
| **KOR** | - | - | - | - | O | - | - | O | - | O |
| **RUS** | O | O | O | O | O | O | O | O | - | - |
| **SAU** | X | - | - | - | O | - | X | X | - | - |
| **LKA** | O | - | - | - | O | O | O | O | O | O |
| **TJK** |  |  |  |  |  |  |  |  |  |  |
| **THA** | O | O | O | X | O | X | X | O | O | - |
| **UAE** | X | X | X | X | O | X | O | X | O | O |
| **UZB** | O | O | O | O | O | - | O | O | - | O |
| **VNM** | O | O | O | O | O | O | O | O | O | O |
| **YMD** | - | - | - | - | - | - | - | - | - | - |

**QUESTIONS**

1. Expands the spatial and temporal coverage of hydrological observation networks (Yes/No/Not applicable)

2. Implements reliability measures for maintenance procedures for measurement and equipment in hydrological stations and for quality control procedures applied on data collected from hydrological stations (Yes/No/Not applicable)

3. Calculates runoff with quality and accuracy (Yes/No/Not applicable)

4. Measures changes in river flow in snow/glacier-fed rivers (Yes/No/Not applicable)

5. Issues flood and flash flood warnings and constantly improves upon them (Yes/No/Not applicable)

6. Issues landslide/debris flow warnings and constantly improves upon them (Yes/No/Not applicable)

7. Improves hydrological warnings capability through enhanced and effective cooperation with other NMHSs (Yes/No/Not applicable)

8. Enhances the preparedness to predict and manage hydrological droughts and the knowledge for decision-making (Yes/No/Not applicable)

9. Improves the adaptation capacity of water resources systems in a changing climate (Yes/No/Not applicable)

10. Improves the capacity for water-related disaster management (Yes/No/Not applicable)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X

NOT APPLICABLE = -

**XI. b) PUBLIC WEATHER SERVICES** (NUMBERS)

**XI. a) PUBLIC WEATHER SERVICES** (YES/NO)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **5** | **6** | **7** | **8** | **9** | **10** |  |  | **4** |
| **AFG** | X | O | O | X | X | X | X | X | X | **AFG** | 3 |
| **BHR** | O | O | O | O | O | O | O | O | O | **BHR** | 10 |
| **BGD** | O | O | O | O | O | O | O | X | X | **BGD** | 7 |
| **BTN** | X | O | X | O | O | O | X | X | X | **BTN** | 3 |
| **KHM** | O | O | O | O | X | X | X | O | X | **KHM** | 3 |
| **CHN** | O | O | O | O | O | O | O | O | O | **CHN** | 15 |
| **HKG** | O | O | O | O | O | O | O | O | O | **HKG** | 9 |
| **IND** | O | O | O | O | O | O | X | X | O | **IND** | 7 |
| **IRN** | O | O | O | O | O | O | O | O | O | **IRN** | 7 |
| **IRQ** | X | O | O | O | O | O | X | X | X | **IRQ** | 5 |
| **JPN** | O | O | O | O | O | O | X | O | O | **JPN** | 7 |
| **KAZ** | X | O | O | X | X | X | O | O | X | **KAZ** | 3 |
| **KWT** | O | O | O | O | O | O | O | O | O | **KWT** | 4 |
| **KGZ** | X | O | X | X | O | X | X | O | O | **KGZ** | 3 |
| **LAO** | O | O | O | O | O | X | X | O | O | **LAO** | 3 |
| **MAC** | O | O | O | O | O | O | X | O | O | **MAC** | 7 |
| **MDV** | O | O | O | O | O | O | X | X | X | **MDV** | 1 |
| **MNG** | O | O | O | O | O | X | O | O | O | **MNG** | 5 |
| **MYA** | X | O | O | O | O | O | O | O | O | **MYA** | 3 |
| **NPL** | O | O | X | O | O | X | X | O | O | **NPL** | 3 |
| **OMN** | O | O | O | O | O | O | O | X | X | **OMN** | 7 |
| **PAK** | O | O | O | O | O | O | X | X | X | **PAK** | 5 |
| **QAT** | O | O | O | O | O | O | X | O | O | **QAT** | 5 |
| **KOR** | O | O | O | O | O | O | O | O | O | **KOR** | 10 |
| **RUS** | O | O | O | O | O | O | X | O | O | **RUS** | 7 |
| **SAU** | O | O | O | O | O | O | X | O | O | **SAU** | 5 |
| **LKA** | O | O | O | O | O | O | X | O | O | **LKA** | 3 |
| **TJK** |  |  |  |  |  |  |  |  |  | **TJK** |  |
| **THA** | O | O | O | O | O | O | X | O | O | **THA** | 7 |
| **UAE** | O | O | X | O | O | O | X | O | O | **UAE** | 2 |
| **UZB** | O | O | O | O | O | O | X | O | X | **UZB** | 31 |
| **VNM** | O | O | O | O | O | O | X | X | X | **VNM** | 3 |
| **YMD** | X | O | X | O | O | X | O | O | O | **YMD** | 1 |

**QUESTION**

4. Range of public weather forecasts (Days)

**QUESTIONS**

1. Provides nowcasting of high impact weather (0-6 hours ahead) (Yes/No)

2. Issues short-range weather forecasts/warnings (6-24 hours ahead) (Yes/No)

3. Issues medium-range weather forecasts/warnings (1 day – 2 weeks ahead) (Yes/No)

5. Operates a Website for real-time weather information, forecasts and warnings (Yes/No)

6. Operates and updates a website for the delivery and display of services and products (Yes/No)

7. Operates an automatic telephone answering system for weather information, forecasts and warnings (Yes/No)

8. Operates a TV weather programme (Yes/No)

9. Verifies public forecasts accuracy (Yes/No)

10. Obtains feedback from users through opinion surveys, user groups, etc. (Yes/No)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X

**XII. b) PARTNERSHIP** (NUMBERS)

**XII. a) PARTNERSHIP** (YES/NO)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **3** | **4** | **5** | **7** | **8** | **9** | **10** | **11** | **12** |  |  | **2** | **6** |
| **AFG** | X | X | O | X | X | O | O | O | O | O | **AFG** | 0 | 0 |
| **BHR** | X | O | O | O | O | O | O | O | O | O | **BHR** | 0 | 1 |
| **BGD** | X | O | O | X | O | X | X | X | X | X | **BGD** | 0 | 0 |
| **BTN** | X | O | O | X | X | O | O | O | O | O | **BTN** | 0 | 0 |
| **KHM** | X | O | O | O | O | O | X | X | X | O | **KHM** | 0 | 0 |
| **CHN** | O | O | O | O | O | O | O | O | O | O | **CHN** | 3700000 | 88 |
| **HKG** | O | O | O | O | O | O | O | O | O | O | **HKG** | 686000 | 1 |
| **IND** | X | O | O | O | O | X | O | X | O | O | **IND** | 0 | 95 |
| **IRN** | X | O | O | O | X | O | O | O | O | O | **IRN** | 0 | 10 |
| **IRQ** | X | O | X | X | X | O | O | X | X | X | **IRQ** | 17280 | 18 |
| **JPN** | O | X | O | O | O | O | O | O | O | O | **JPN** | 6900000 | 7 |
| **KAZ** | X | X | O | O | X | X | X | X | O | X | **KAZ** | 0 | 2 |
| **KWT** | X | O | O | O | X | X | O | O | O | O | **KWT** | 0 | 2 |
| **KGZ** | X | X | O | O | O | O | X | X | O | O | **KGZ** | 0 | 2 |
| **LAO** | X | O | O | O | X | X | X | X | X | X | **LAO** | 0 | 5 |
| **MAC** | X | X | X | O | O | O | X | X | X | X | **MAC** | 0 | 1 |
| **MDV** | X | X | X | O | O | X | X | X | X | X | **MDV** | 0 | 2 |
| **MNG** | O | X | X | O | X | O | O | O | O | X | **MNG** | 0 | 5 |
| **MYA** | X | O | O | O | X | O | O | X | O | O | **MYA** | 0 | 25 |
| **NPL** | X | X | X | X | X | X | X | X | X | X | **NPL** | 0 | 5 |
| **OMN** | X | X | X | O | X | X | X | X | X | X | **OMN** | 0 | 34 |
| **PAK** | X | X | O | O | X | O | O | X | O | X | **PAK** | 0 | 30 |
| **QAT** | X | O | O | O | O | O | O | O | O | O | **QAT** | 0 | 1 |
| **KOR** | X | O | X | O | X | O | X | X | O | O | **KOR** | 0 | 6 |
| **RUS** | X | O | O | O | O | X | X | X | X | X | **RUS** | 0 | 94 |
| **SAU** | X | X | X | O | X | X | X | X | X | X | **SAU** | 0 | 14 |
| **LKA** | X | O | O | O | X | X | X | X | X | X | **LKA** | 0 | 10 |
| **TJK** |  |  |  |  |  |  |  |  |  |  | **TJK** |  |  |
| **THA** | X | O | O | O | X | X | X | X | X | X | **THA** | 0 | 16 |
| **UAE** | X | X | X | X | O | X | X | X | X | X | **UAE** | 0 | 2 |
| **UZB** | X | O | X | X | X | O | O | X | O | O | **UZB** | 0 | 4 |
| **VNM** | X | X | X | X | X | O | O | O | O | O | **VNM** | 0 | 0 |
| **YMD** | X | X | X | O | O | O | X | X | X | X | **YMD** | 0 | 2 |

**QUESTIONS**

1. Collects and distributes automated meteorological observations from aircraft (Yes/No)

3. Engages in health-related studies in association with partner organizations (Yes/No)

4. Engages in socio-economic studies demonstrating the benefits of meteorological, climatological and hydrological infrastructure, information, products and services (Yes/No)

5. Contributes operational weather information to WMO’s on-line World Weather Information Service (WWIS) (Yes/No)

7. Supports the exchange of official warnings of severe weather by contributing to WMO’s on-line Severe Weather Information Centre (SWIC) (Yes/No)

8. Joins the RA II Pilot Project to Develop Support for NMHSs in Numerical Weather Prediction (Yes/No)

9. Joins the RA II Pilot Project on Information Sharing on Climate Services (Yes/No)

10. Joins the RA II Pilot Project to Develop Support for NMHSs in the Collection and Application of Aircraft Meteorological Data Relay Data (Yes/No)

11. Joins the RA II Pilot Project to Sustain and Enhance the Capacity of NMHSs in the Provision of Official Weather Forecasts for Medium Range (Yes/No)

12. Joins the RA II Pilot Project to Enhance the Seamless Provision of Regional Severe Weather Warnings and Advisories (Yes/No)

**QUESTIONS**

2. Number of automated meteorological observations from aircraft generated per year

6. Number of cities for which weather forecasts are on WWIS

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

YES = O

NO = X