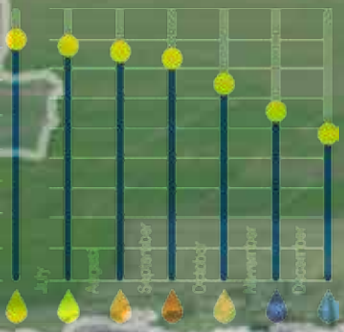


DISTRICT BAHAWALPUR

PUNJAB - PAKISTAN

MONTHLY TEMPERATURE



MULTI HAZARD VULNERABILITY & RISK ASSESSMENT (MHVRA)

Project Management Unit
National Disaster Management Authority
Islamabad, Pakistan



United Nations
World Food
Programme

DISTRICT BAHAWALPUR

PUNJAB - PAKISTAN

MULTI HAZARD VULNERABILITY & RISK ASSESSMENT (MHVRA)

National Disaster Management Authority,
Prime Minister's Office, 2nd Floor, Sector G-5/1
Constitution Avenue, Islamabad - Pakistan
www.ndma.gov.pk



United Nations
**World Food
Programme**

The National Disaster Management Authority (NDMA) is the lead federal agency to deal with the whole spectrum of Disaster Management in Pakistan. It was established in 2007 through NDM Ordinance and was finally provided parliamentary cover by an act of Parliament in 2010. The NDMA is the executive arm of the National Disaster Management Commission (NDMC), which was established under the Chairmanship of the Prime Minister of Pakistan, as an apex policy making body in the field of Disaster Management. The NDMA aims to develop sustainable operational capacity and professional competence to coordinate the emergency response of Federal Government in the event of a national disaster.

Developed by

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We appreciate your feedback

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FOREWARD

The primary goal of the National Disaster Management Authority (NDMA) is to achieve sustainable social, economic and environmental development in Pakistan through reducing risks and vulnerabilities by effectively responding to and recovery from all types of disasters.

Pakistan is among the countries most vulnerable to natural and man-made disasters. The country's acute vulnerability to disasters is due to its geographical location, diverse topography, hydrological configuration and extended fault-lines. The recurrent disasters have taken a heavy toll on the long-term sustainability of the country. The vulnerability to disasters is growing in both urban and rural areas, placing even more lives and livelihoods at risk.

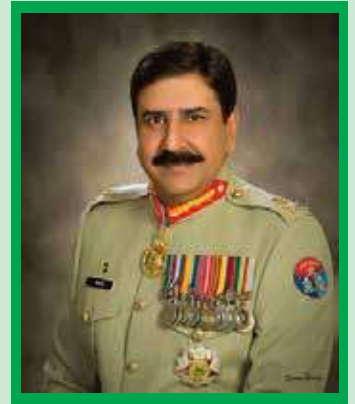
NDMA, being the country's apex body for implementing, coordinating and monitoring whole spectrum of disaster management activities in Pakistan, has always remained focused to achieve its vision of building disaster resilient Pakistan. Significant efforts have been made in this direction to reduce the country's vulnerability to several impending disasters. National Disaster Management Plan (NDMP) 2012-2022 reflects our priorities i.e. adopting a proactive approach towards disaster risk management. For implementation of NDMP's key interventions, NDMA conceived an implementation roadmap for NDMP (2016-2030) wherein particular emphasis has been laid on Multi Hazard Vulnerability & Risk Assessment (MHVRA) Intervention.

MHVRA study plays an instrumental role in integrated Disaster Risk Reduction (DRR) planning and mainstreaming DRR into development at local, provincial, and national level. It guides the relevant agencies/ line departments in requisite land-use planning and implementation of national scale programs aligned to vulnerabilities at a community level. The knowledge gain from the study can also play a cardinal role in development of robust knowledge management framework for long-term socio-economic sustainable growth.

For MHVRA related activities, NDMA has raised Project Management Unit (PMU). I am delighted to know that PMU has successfully conducted the MHVRA study of five selected districts of Punjab by utilizing the in-house technical resources. It is noteworthy to mention that this Project is first of its kind and demonstrates high degree of expertise for data processing and visualization. I am very much satisfied with the results and hope this document will act as a constant source for informed decision making for all stakeholders. I would like to extend my gratitude to the Members of NDMP Steering Committee for taking keen interest in guiding the project team throughout the course of this Study and endorsing its results.

I would like to place on record my sincere appreciation for the contributions of Development Partners, NGOs/INGOs and academia for their valuable inputs during the execution of this Study. A profound gratitude goes to the United Nation World Food Program, Pakistan for their support and cooperation for initiating and pioneering MHVRA initiatives in Pakistan and for their long-term support in establishing PMU in NDMA.

Last but not the least, the Project was also meant for development of NDMA in-house capacity to take similar endeavors in the future as well and with the Blessing of Almighty Allah we have been able to cover a lot of mileage. I believe, this is the first step for a long journey ahead which requires a steadfast and consistent efforts which for contributions of partners will be highly appreciated.



Lieutenant General
Omar Mahmood Hayat, HI (M)
Chairman, National Disaster
Management Authority (NDMA)

ACKNOWLEDGEMENT

The National Disaster Management Authority (NDMA) is pleased to launch the Multi Hazards Vulnerability and Risk Assessment (MHVRA) Atlas of five selected districts of Punjab, prepared mainly as a dynamic planning tool for Disaster Risk Management (DRM) officials of Government, Humanitarian Agencies and Development Partners at provincial and district levels for improved and informed Disaster Risk Reduction (DRR), Preparedness and Contingency Planning.

An esteem of gratitude is owed to the Former Chairman NDMA, Major General (R) Asghar Nawaz HI(M) and the Current Chairman Lieutenant General Omar Mahmood Hayat HI(M), for their visionary approach, guidance and direction in constituting this Study. They remained a source of guidance at each stage of this project which ultimately had resulted in successful execution of this Project..

We profoundly acknowledge Senior DRM Officer, Mr. Sultan Mehmood of Disaster Risk Reduction (DRR) Unit and Program Officer Mr. Iftikhar Abbas of Vulnerability Analysis & Mapping (VAM) Unit of World Food Program (WFP) for their support and cooperation for all our initiatives and endeavors throughout the working of this project. We acknowledge and express our sincere and deep appreciation for their assistance in this regard.

Our sincere and passionate felicitations to Former Member Disaster Risk Reduction (DRR) NDMA, Mr. Ahmed Kamal, Current Member DRR, NDMA, Mr. Idrees Mehsud, Director Implementation Lieutenant Colonel (R) Raza Iqbal and Assistant Director Projects Mr. Shafi Agha for their continuous support, prized guidance and relevant inputs based on their vast experience and knowledge that contributed immensely in this endeavor.

We acknowledge significant contributions made by institutions and individuals at district, provincial, national by providing data and information required to smoothly carryout this project. In addition, the proficiencies provided by the consultant of different disciplines were crucial, as it helped to maintain precision throughout the assessment.

In the end, we would like to extend our heartiest gratitude to all our relevant stakeholders who rendered their full support, contribution and active participation during execution of this Study. Their contributions are sincerely appreciated and acknowledged.

PREFACE

Pakistan by virtue of its diverse topographic features is vulnerable to wide degree of natural and man-made disasters. Events exhibited under many forms in the past are the testimonies to the country's susceptibility to disasters. Until recently, a reactive emergency response approach remained chiefly applicable to deal with disasters in Pakistan. However, disasters continued to exact a heavy toll on country's economy, human lives and environment and, consequently, manifested the need for developing a different strategy towards Disaster Risk Management (DRM). Against this backdrop, a shift from hitherto response based approach to proactive disaster management was adopted through 2007 National Disaster Management Ordinance, now known as National Disaster Management (NDM) Act 2010.

National Disaster Management Authority (NDMA), with provision of NDMA Act 2010 and in-line with the DRR Policy, formulated a 10-year comprehensive National Disaster Management Plan (NDMP) 2012–2022 outlining ten priority areas and 118 specific interventions and projects for implementation over the span of ten years. The priority number three and four under NDMP 2012–2022 warrant execution of Multi Hazard Vulnerability and Risk Assessment (MHVRA) Intervention in the Country. In this regard, a roadmap i.e. NDMP implementation roadmap 2016–2030 was chalked out for phase-wise execution of MHVRA Intervention at micro level, down to UC Level, for all districts of Pakistan and AJ&K.

In view of the Country's vulnerability to multiple disasters, the implementation of MHVRA Intervention is considered essential for achieving national and global commitments, some of those outlined in Millennium Development Goals (MDGs) & Sustainable Development Goals (SDGs), Sendai Framework for Disaster Risk Reduction (SFDRR), Climate Change Policy 2012, National Disaster Risk Reduction (DRR) Policy 2013, NDMP 2012–2022 and Pakistan Vision 2025.

Cognizance of the importance of MHVRA component, NDMA, being an apex body to deal with the whole spectrum of disaster management, embarked upon establishing holistic and well-structured methodology for country-specific MHVRA activity. To this end, Project Management Unit (PMU) has been established in NDMA for execution and monitoring of the MHVRA Studies in the Country, with an aim to clearly estimate and map the risk of communities nationwide. PMU, as the first step, laid down "NDMA Policy & Execution Guidelines for the conduct of MHVRA" to maintain unanimity in risk assessment methodology across the Country and AJ&K. The Guidelines constitute an important part of NDMA's effort towards provision of unified standards and procedures for the hazard, exposure, vulnerability and risk assessments.

To test the various attributes of the MHVRA Guidelines, PMU with the support of World Food Programme (WFP), conducted a micro-level MHVRA intervention, down to the level of Union Council, for selected five districts of Punjab namely Bahawalpur, Jhang, Khushab, Multan and Rahim Yar Khan. This Project has a distinction of being the only study to be endorsed by Steering Committee formulated to oversee implementation of NDMP. The NDMP Steering Committee consists members from all lead technical agencies of Pakistan including representatives from S/GB/F/PDMA, Pakistan Meteorological Department (PMD), Planning Commission, Planning Development & Reforms Division, Finance Division, Economic Affairs Division, Ministry of Water & Power, Ministry of Climate Change, Federal Flood Commission (FFC), Geological Survey of Pakistan (GSP), Space & Upper Atmosphere Research Commission (SUPARCO) and Survey of Pakistan (SOP) as well as representatives from academia.

This Study involved identification and analysis of prevailing hazards in the study districts through field level consultation with local stakeholders and analysis of historical records. Three hazards namely drought, flood, earthquake have been considered for hazard analysis owing to their frequent recurrence in the study districts. The project covered various scientific and technical activities, including a review of past and ongoing studies related to hydrological, seismological and geological phenomenon. For hazard modelling and analysis, probabilistic and scenario based hazard assessment tools have been employed in the project. Technical parameters used for hazard estimation include information concerning soil moisture condition, climatic, biotic & edaphic factors of soil, temperature condition, vegetation health, water flow paths, flood catchment area, streamline data, land use data, river discharge information, flood extent, flood velocity, precipitation, seismic sources, plate tectonics, geomorphology, soil data, bore hole data, fault zones, ground motion prediction equations, seismic intensity (PGA), soil ground motion amplification factor and so on.

Exposure have been mapped in the dimensions of population, physical elements, life lines, essential facilities, transportation facilities, socio-economic aspects, economic activities, environmental elements, critical infrastructure, agriculture and livestock elements; being termed as elements at risk. Various statistical tools such as projection equations, dissimilarity index, have been employed in the Project to extrapolate information beyond the available frame.

Vulnerability analysis have been conducted considering three dimensions i.e. physical, social and agriculture (Food Insecurity). For physical vulnerability, fragility curves have been developed using available technical and statistical tools (Probabilistic or Empirical fragility models). For social vulnerability, several technical tools such as Principal Component Analysis (PCA) and Social Vulnerability Indicator (SoVI) have been utilized to obtain possible driving factors contributing to the social vulnerability in the study area. Vulnerability analysis in the context of agriculture and food security have also been undertaken to determine sets of contributing factors to food insecurity and agricultural vulnerability. The stressor covered epidemic, endemic, biotic and edaphic factors and sudden shocks such as earthquake, flood and drought.

Coping capacity has been anticipated by assessing existing capacities of organization to manage disasters. The coping capacity has further been divided into three main factors i.e. capacity to anticipate risk, capacity to respond and capacity recover. Adaptive capacity has been evaluated using fifteen indicators.

For Risk Assessment, Analytical Hierarchy Process (AHP) and Multi Criteria Decision Making approaches have been employed in the Study. The risk assessment has been carried out using qualitative, quantities or semi quantitative approach. On basis of these factor components, the cumulative risk profile of the study districts (risk indexing down to UC Level) have been developed. Various DRR intervention and mitigation measures have formulated and finally Cost Benefit Analysis (CBA) of proposed DRR interventions have been performed to estimate their economic feasibility.

(Continued)

Close linkages with the National, provincial and district organizations have been established through stakeholder consultation arrangements in order to facilitate secondary data collection, hazard specific information exchange, and sharing of any other relevant data. For this purpose, several data collection tools have been utilized in the Study such as focus group discussion, key informant interviews, participatory rural appraisal, semi structured interviews and one-to-one interviews with community level stakeholders and line departments.

ABOUT THIS ATLAS

An accurate, easy-to-interpret and up-to-date information is one of the most fundamental elements of decision-making process. Information, particularly in the realm of disaster management, plays an instrumental role in the risk-informed Disaster Risk Reduction (DRR) planning. It makes the relevant departments aware of the likely losses, relative vulnerabilities, exposure and impending disaster risks in the study area, enabling them to effectively undertake prevention, mitigation, preparedness and response based measures before or at the onset of any emergency situation. However, compilation and visualization of information concerning Multi Hazard Vulnerability & Risk Assessment (MHVRA) study is fairly a challenging task since it demands multi-dimensional analysis of different natural processes to understand their composite effects over the study area. Similarly, presentation of the outputs of MHVRA study to the end user, in an easy manner, is yet another challenging task, which requires development of data visualizing tools, graphic aids, catalog of charts and map composition with effective cartographic language. This Atlas is one major step to achieve the said objectives. Much effort has been put in to provide easy to comprehend and interactive information to the users.

This Atlas provides detailed baseline maps of the study district covering several dimensions to include geology, climatology, land use, land cover, elevation, population, settlements, buildings, transportation, telecommunication, health, education, irrigation infrastructure, industries, livestock, agriculture etc. Several graphical tools have been employed to produce easy to grasp charts, these include pie-charts, histograms, ring charts, matrix diagram, bar charts, line graphs, 3D charts and informative tables. The Atlas also provides brief hazard assessment methodologies for each selected hazards i.e. drought, earthquake and flood, along with maps for various return periods. Exposure Matrix Tables identifying the exposed elements at risk have also been developed along with the exposure maps. A brief risk assessment methodology is also provided in the atlas with the risk maps. All the study has been conducted at micro-level, down to the level of Union Council. This Study is first of its kind and demonstrates high level of expertise, arduous work and coordinated approach involving cross-sectorial stakeholder linkages.

The Product shall be useful for policymakers and practitioners for risk-informed land-use planning, mainstreaming DRR into development programs and implementation of national scale programs aligned to ground. The project would render substantial baseline information over which other micro level DRR plans could be devised and will serve as a state of the art planning tool enabling mapping of resources in the study district.

List of Officers/Officials involved in MHVRA Punjab Study

Technical Team

| Name | Designation/Position |
|-------------------------------|--|
| Mr. Ehtisham Khalid Khan | Project Director / Team Lead |
| Ms. Nimrah Khalid | MHVRA Expert |
| Mr. Asif Jan Turangzai | Senior MHVRA Expert (Till October, 2016) |
| Mr. Saad Shams Butt | GIS Expert (Till September, 2016) |
| Mr. Syed Muhammad Tayyab Shah | Project Officer |
| Mr. Aamir Qayyum | Project Officer |
| Ms. Mashal Riaz | MHVRA Officer |
| Ms. Sana Zahid Shah | GIS Officer |
| Ms. Zahra Hassan | GIS Officer |
| Mr. Ismail Khan | Project Officer (Till September, 2016) |
| Mr. Malik Zaheer-ud-Din | Project Officer (Till August, 2016) |
| Ms. Sarah Ovais | GIS Associate (Till September, 2016) |
| Ms. Saman Mushtaq | GIS Associate (Till September, 2016) |
| Mr. Muhammad Waqas | MHVRA Associate (Till February, 2017) |
| Mr. Sheikh Rafay Ehsan | MHVRA Intern |

Consultants

| Name | Consultancy Area |
|----------------------|--|
| Dr. Naveed Ahmad | Seismic Hazard Analysis and Vulnerability Analysis |
| Dr. Bashir Ahmad | Drought Hazard Analysis |
| Dr. Athar Ashraf | Flood Hazard Analysis |
| Dr. Wajid Pirzada | Food Insecurity Study |
| Dr. Shahzad Ali Khan | Cost & Benefit Analysis |
| Mr. Amjad Ahmad | Risk Assessment |

Support Team

| Name | Designation/Position |
|--------------------|--|
| Ms. Muqaddas Iqbal | Project Coordinator (Till September, 2016) |
| Mr. Ghulam Rasool | Admin and Account Officer |
| Mr. Shahid Malik | Field Surveyor |
| Mr. Ali Tassadaq | Account Intern (Till February, 2017) |
| Mr. Tilwat Khan | Office Assistant |
| Mr. Nasir Khan | Office Assistant |

National Disaster Management Plan (NDMP)

Steering Committee - Participants List (19th Sep & 9th Dec 2016)

| Name | Designation | Position | Department |
|-----------------------------|--|-------------------|--|
| Maj. Gen. Asghar Nawaz | Chairman | Chair | National Disaster Management Authority (NDMA), Pakistan |
| Mr. Ahmed Kamal | Member (Disaster Risk Reduction) | Member/ Secretary | |
| Brig. Ishtiaq Ahmed | Member (Operations) | Member | |
| Mr. Ehtisham Khalid Khan | Project Director/Team Lead | Member | |
| Mr. Chaudhry Muhammad Anwar | Chief (PPH) | Member | Planning and Development Division |
| Mr. Syed Zawad Haider Shah | Section Officer | Member | Economics Affairs Division |
| Mr. Syed Zakria Ali Shah | Deputy Secretary (UN) | | |
| Mr. Muhammad Saleem Khatak | Deputy Secretary | Member | Ministry of Climate Change |
| Mr. Wasim Akhtar | Deputy Secretary (Development) | | |
| Mr. Muhammad Afzal Shabzada | Deputy Director | | |
| Mr. Arshad Ahmed | Senior Joint Secretary | Member | Finance Division |
| Mr. Malik Aman | DSA (NDMA) | | |
| Mr. Khalid Sher Dil | Director General | Member | Provincial Disaster Management Authority, Punjab |
| Mr. Hameedullah Malik | Project Director | | |
| Mr. Nisar Ahmed Sani | Documentation Officer | | |
| Mr. Syed Ahmed Fawad | Director (Operations) | Member | Provincial Disaster Management Authority, Sindh |
| Mr. Amer Afaq | Director General | Member | Provincial Disaster Management Authority, Khyber Pakhtoonkha |
| Mr. Wajid Ali Khan | Deputy Director (Relief) | | |
| Mr. Israr Muhammad | Director (R&R) | | |
| Mr. Faisal Khan Baloch | Assistant Director | Member | Provincial Disaster Management Authority, Balochistan |
| Mr. Muhammad Khalid Sherdil | Director General | Member | FATA Disaster Management Authority |
| Mr. Main Adil Zahoor | Assistant Director (Operations & Relief) | | |
| Mr. Zaheer-udin-Babar | Deputy Director | Member | Gilgit Baltistan Disaster Management Authority |
| Mr. Abdul Waheed Shah | Director General | | |
| Mr. Zaheer-udin-Qureshi | Director General | Member | State Disaster Management Authority Azad Jammu & Kashmir |
| Dr. Muhammad Hanif | Director (NWFC) | Member | Pakistan Meteorological Department |
| Mr. Zafar Iqbal | Senior Engineer | Member | Federal Flood Commission, Ministry of Water and Power |
| Mr. Alamgir | Chief Engineer | | |
| Mr. Muhammad Ishtiaq | Director | Member | Survey of Pakistan |
| Mr. Syed Zuhair Bukhari | Director | Member | Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) |
| Mr. Zafar Iqbal | Director | | |
| Mr. Muhammad Farooq | General Manager | | |
| Mr. Sardar Saeed Akhter | Director | Member | Geological Survey of Pakistan |
| Mr. Simon Sadiq | Deputy Director | | |
| Brig Sajid Naeem (R) | Senior Capacity Building Expert | Member | National Institute of Disaster Management |
| Dr. Talat Iqbal | Deputy Chief Scientist / Director | Co-opted Member | Center for Earthquake Studies, PAEC |
| Dr. Muhammad Ali Shah | Manager (DM & R Division) | Co-opted Member | Micro Seismic Studies Program, Pakistan Atomic Energy Commission (MSSP,PAEC) |
| Mr. Thi Van Hoary | Head of Vulnerability Analysis & Mapping | Observer | World Food Program, Pakistan (UN- WFP) |
| Mr. Iftikhar Abbas | Program Officer (Spatial Analyst) | | |
| Ms. Umber Khan | Program Officer | Observer | Department for International Development (DFID) |
| Mr. Sherwan Asif | Program Manager | | |
| Mr. Shaukat Shafi | Senior Project Officer | Observer | Asian Development Bank (ADB) |

GLOSSARY OF TERMS

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|---|--|
| Acceptable Risk | The level of potential losses that a society or community considers acceptable given existing social, economic, political, cultural, technical and environmental conditions. |
| Accountability | Obligation to demonstrate that work has been conducted in compliance with agreed rules and standards or to report fairly and accurately on performance results vis a vis mandated roles and/or plans. This may require a careful, even legally defensible, demonstration that the work is consistent with the contract terms. |
| Activity | Actions taken or work performed through which inputs, such as funds, technical assistance and other types of resources. |
| Adaptation | The adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. |
| Affected Area | An area or part of country affected by disaster. |
| Alluvium Deposits | A deposit of clay, silt, and sand left by flowing floodwater in a river valley or delta, typically producing fertile soil. |
| Avalanche | An avalanche (also called a snow slide) is a rapid flow of snow down a sloping surface of a mountain. Avalanches are triggered due to mechanical failure of the snow when the forces on the snow exceed its cohesion strength. |
| Average Household Size | Average Number of persons per household. |
| Bare Area with Sparse Natural Vegetation | Sand Dunes with natural vegetation, bare rocks (with sparse vegetation) and desert flat plains are included in this class. |
| Bare Areas | This class describes areas that have very less natural and manmade vegetation cover which include sand dunes and barren land. |
| Base-Line Study | An analysis describing the situation prior to a development intervention, against which progress can be assessed or comparisons made. |
| Basic Health Unit (BHU) | The BHU is located at a Union Council and serves a catchment population of up to 25,000. Services provided at BHU are promotive, preventive, curative and referral. BHU provides all PHC services along with integral services that include basic medical and surgical care. MCH services are also part of the services package being provided at BHU. BHU provides first level referral to patients referred by LHWs. BHU refers patients to higher level facilities as and when necessary. |
| Built-up Area | It defines all built areas (urban, industrial, airport etc.) with all vegetated areas linked to the built-ups such as gardens, golf courses, urban recreation parks, plots devoted to urban expansion etc. |
| Capacity | The combination of all the strengths, attributes and resources available within a community, society or organization that can be used to achieve agreed goals. |
| Capacity Building | Efforts aimed to develop human skills or societal infrastructure within a community or organization needed to reduce the level of risk. In extended understanding, capacity building also includes development of institutional, financial, political and other resources, at different levels of the society. |
| Census | Census is an official count or a survey, especially of a population. |
| Climate Change | (a) The Inter-governmental Panel on Climate Change (IPCC) defines climate change as: "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external force or to persistent anthropogenic changes in the composition of the atmosphere or in land use". (b) The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods". |
| Climatology | Climatology or climate science is the scientific study of climate, scientifically defined as weather conditions averaged over a period of time. |
| Coping Capacity | The means by which people or organizations use available resources and abilities to face a disaster. In general, this involves managing resources, both in normal times as well as during crises or adverse conditions. |
| Craton | The term craton is used to distinguish the stable portion of the continental crust from regions that are more geologically active and unstable. Cratons can be described as shields, in which the basement rock crops out at the surface, and platforms, in which the |

basement is overlaid by sediments and sedimentary rock.

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| Critical Facilities | The primary physical structures, technical facilities and systems which are socially, economically or operationally essential to the functioning of a society or community, both in routine circumstances and in the extreme circumstances of an emergency. |
| Crop Irrigated | Areas used for the production of annual crops, such as corn, vegetables, soybeans, tobacco and cotton. This class also includes all land being actively tilled. |
| Crop Marginal and Irrigated Saline | Crop marginal and irrigated saline are identified as those areas which are currently used for agriculture with low and unstable rainfall or higher rainfall areas intensively used, relative to user capability, under existing population densities, traditional technologies and institutional structures. |
| Crop Rainfed | The term rainfed agriculture is used to describe farming practices that rely only on rainfall for water. |
| Cyclone | A large-scale system of winds that spiral in toward a region of low atmospheric pressure. Because low-pressure systems generally produce clouds and precipitation, cyclones are often simply referred to as storms. A tropical cyclone is one that forms over warm tropical waters. Such a system is characterized by a warm, well-defined core and can range in intensity from a tropical depression to a tropical cyclone. While tropical cyclones can produce extremely powerful winds and torrential rain, they are also able to produce high waves and damaging storm surge. |
| Debris Flow | This is a phenomenon in which soil and rock on the hillside or in the riverbed are carried downward at a dash under the influence of continuous rain or torrential rain. |
| Demographics | It is the statistical data relating to the population and particular groups within it. |
| Density | Density refers to number of elements (population, buildings, roads etc.) per unit area. |
| Disaster | <p>A catastrophe or a calamity in an affected area arising from natural or man-made causes or by accident which results in substantial loss of life or human suffering or damage to, and destruction of property.</p> <p>A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources.</p> |
| Disaster Management | Managing the complete spectrum of disaster including preparedness, mitigation, response, recovery, relief and rehabilitation. |
| Disaster Risk | The potential disaster losses, in lives, health status, livelihoods, assets and services, which could occur to a particular community or a society over some specified future time period. |
| Disaster Risk Management (DRM) | The systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster. |
| Disaster Risk Reduction (DRR) | The concept and practice of reducing disaster risks through systematic efforts to analyses and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. |
| District Head Quarter (DHQ) | The District Head Quarters (DHQ) Hospital is located at District headquarters level and serves a population of 1 to 3 million, depending upon the category of the hospital. The DHQ hospital provides promotive, preventive, curative, advance diagnostics, inpatient services, advance specialist and referral services. All DHQ hospitals are supposed to provide basic and comprehensive care. |
| Drought | A drought is an extended period when an area notes a deficiency in its water supply when the demand for water exceeds the supply. Generally, this occurs when an area receives consistently below average precipitation. It can have a substantial impact on the ecosystem and agriculture of the affected region. |
| Early Warning | The provision of timely and effective information, through identified institutions, to communities and individuals so that they could take action to reduce their risks and prepare for effective response. |
| Earthquake | Earthquake is defined as shaking and vibration at the surface of the earth resulting from underground movement along a fault plane of from volcanic activity or due to movement of plate boundaries of the Earth. The scale of earthquakes is measured by moment magnitude and the shaking intensity at each location is usually reported by Mercalli intensity scale. |
| Effectiveness | The extent to which the development intervention's objectives were achieved, or are expected to be achieved, taking into account their relative importance. |
| Efficiency | A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results. |
| Element at Risks | Elements at Risk include all tangible (population, essential and critical infrastructure, building, crops and so on) and intangible elements (monetary values) that are at risk to any potential damage during extreme events. |
| Elevation | The measurement of height of a surface above sea level or ground level. |

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| Emergency Management | The management and deployment of resources for dealing with all aspects of emergencies, in particularly preparedness, response and rehabilitation. |
| Employment | The “employed” comprises all persons ten years of age and above who worked at least one hour during the reference period and were either “paid employed” or “self-employed”. Persons, employed on permanent/regular footings, who have not worked for any reason during the reference period are however, treated as employed. |
| Entity | Any government or non-government organization, national or international stakeholders including Federal, Provincial and District agencies and United Nations’ agencies relevant to Disaster Management as described in Section 23-2 [(a) and (d)] of NDM Act 2010, which is interested in the execution of MHVRA activity hereinafter referred to as Entity. |
| Eolian Deposits | Eolian Deposits are the Wind-blown deposits on Planetary surface. |
| Evaluation | The systematic and objective assessment of an on-going or completed project, program or policy, its design, implementation and results. The aim is to determine the relevance and fulfillment of objectives, development efficiency, effectiveness, impact and sustainability. An evaluation should provide information that is credible and useful, enabling the incorporation of lessons learned into the decision making process of both recipients and donors. |
| Evaporites | Evaporites are individual minerals found in the sedimentary deposit of soluble salts that results from the evaporation of water. |
| Exposure | People, property, systems, or other elements present in hazard zones that are subject to potential losses. |
| Flash Flood | A flash flood is a phenomenon of rapid flooding (mostly less than 6 hours) of geomorphic low-lying areas due to downpour or heavy rains caused by low depression, climate front line (thunderstorm) or cyclone. |
| Flood | Flood is a phenomenon of inundation by water coming from a direct rainfall or river, drainage or other water bodies, such as lakes or seas due to overflowing from ordinary boundary between land and water or water surging. |
| Flood Plain Deposits | Floodplain deposits are also called as Alluvial Plain, flat land area adjacent to a stream, composed of unconsolidated sedimentary deposits (alluvium) and subject to periodic inundation by the stream. |
| Food Insecurity | The state of being without reliable access to a sufficient quantity of affordable and nutritious food. |
| Forecast | Estimate of the occurrence of a future event (UNESCO, WMO). The term is used with different meanings in different disciplines. |
| Geography | Geography is the study of the Earth and its features, its inhabitants, and its phenomena. |
| Geological Composition | Geological composition is the fundamental unit of lithostratigraphy that contain certain amount of rock strata that have a comparable lithology, facies or other similar properties. |
| Geology | Geology is an earth science concerned with the solid Earth, the rocks of which it is composed and the processes by which they change over time. |
| Geospatial Data Bank | Spatial Data and Geographic Information Management System (GIS) data relevant to disaster and the corresponding data integration in the form of geospatial data bank. In the context of disaster management, following types of data is required: <ul style="list-style-type: none"> i. Data on the disastrous phenomena (e.g. landslides, floods, earthquakes), their location, frequency, magnitude etc. ii. Data on the environment in which the disastrous events might take place: topography, geology, geomorphology, soils, hydrology, land use, vegetation etc. iii. Data on the elements that might be destroyed if the event takes place: infrastructure, settlements, population, socioeconomic data etc. iv. Data on the emergency relief resources, such as hospitals, fire brigades, police stations, warehouses etc. |
| GLOF | “GLOF” refers to a Glacial Lake Outburst Flood that occurs when water in a glacier lake suddenly discharges due to a breach of a moraine dam (glacier lake). The results can be catastrophic to the downstream riparian area. (Richardson and Reynolds 2000). |
| Hazard | A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. |
| Hazard Analysis | Identification, studies and monitoring of any hazard to determine its potential, origin, characteristics and behavior. |
| Hill Torrent (Flood) | Hill torrent floods are basically a rapid flooding of geomorphic steep surface areas at alluvial cones or floodplain areas caused by overflowing water from channels due to rapid velocity and any amount of flow quantity. |
| Household | A household is defined to be constituted of all those persons who usually live together and share their meals. A household may consist of one person or more than one person who may or may not be related to each other. |
| Human-Induced Disasters | Natural disasters that are accelerated/ aggravated by human influence. A landslide, for example, may be purely natural, as a result of a heavy rainfall or earthquake, but it may also be human induced, as a result of an over steepened road-cut. |

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| Human-Made Disasters | Events which are caused by human activities (such as atmospheric pollution, industrial chemical accidents, major armed conflicts, nuclear accidents, oil spills etc.) |
| Impacts | Positive and negative, primary and secondary long-term effects produced by a development intervention, directly or indirectly, intended or unintended. |
| Indicators | Indicators are variables or parameters used to describe drought conditions. Examples include precipitation, temperature, streamflow, groundwater and reservoir levels, soil moisture, snowpack, etc. |
| Indices | Indices are typically a computed numerical representation of drought severity, assessed using climatic or hydro-meteorological inputs including the indicators listed above. In short, they aim to measure the qualitative state of drought on the landscape for a given time period. Indices are technically indicators as well. Monitoring the climate at various timescales allows identification of short-term wet periods within long-term droughts or short-term dry spells within long-term wet periods. |
| Infant Mortality Rate | The number of deaths of infants under one year of age per 1000 live births in a given year. |
| Irrigated Area | Irrigated agricultural area refers to the area in which the moisture of soil is controlled for the better growth of seeds and better crop production by providing water through different mode of water supply such as rivers, major, minor or distributary canals, tube wells, wells, spraying or other water to the crops. |
| Irrigation Sources | It refers to the source(s) by means of which the cultivated area is irrigated partially or wholly. |
| Land Cover | Land Cover is defined as the observed (bio) physical cover on the earth's surface. |
| Land Use | Land Use is characterized by the arrangements, activities and inputs that people undertake in a certain type of land in order to produce, change or maintain it. |
| Land Use Planning | The process undertaken by public authorities to identify, evaluate and decide on different options for the use of land, including consideration of long term economic, social and environmental objectives and the implications for different communities and interest groups, and the subsequent formulation and promulgation of plans that describe the permitted or acceptable uses. Land-use planning can help to mitigate disasters and reduce risks by discouraging high-density settlements and construction of key installations in hazard-prone areas, control of population density and expansion Mitigation Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards. |
| Landslide | A landslide is a phenomenon in which the movement of a mass of rock, debris, or earth down a slope due to gravity. The materials may move by falling, toppling, sliding, spreading, or flowing. Since a large amount of soil mass usually moves, serious damage can occur. |
| Latitude | Latitude is a geographic coordinate that specifies the north–south position of a point on the Earth's surface. Latitude is an angle (defined below) which ranges from 0° at the Equator to 90° (North or South) at the poles. |
| Longitude | Longitude is a geographic coordinate that specifies the east-west position of a point on the Earth's surface. It is an angular measurement, usually expressed in degrees |
| Meander-Belt | The part of a valley bottom across which a stream shifts its channel from time to time especially in flood. |
| Middle Schools | Middle Schools are the schools that provide education from 5 th to 8 th grade. |
| Mitigation | The lessening or limitation of the adverse impacts of hazards and related disasters. |
| Monitoring & Evaluation (M&E) | A continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing development intervention with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds. |
| Mortality Rate | Number of deaths recorded in a population of particular region in a year. |
| Mouza / Deh | It is a territorial unit with a separate name, definite boundaries, and area precisely measured and divided into plots / khasras / survey numbers. Each mouza is a revenue estate and has a cadastral map maintained in the land revenue record with a Hadbast Number except Sindh Province. Mouza, Deh, Village, Killi and Chak are the names commonly used for it. The term mouza / deh is widely used in the settled areas while the term village and or killi are used in the unsettled areas. There may be one or more settlements, abadies, basties, dhokes, goths, etc. in the territory of a mouza / deh. The mouzas / dehs may also have scattered inhabitation while there may be some mouzas without population as well. |
| Multi Hazard Vulnerability and Risk Assessment (MHVRA) | Multi Hazard Vulnerability and Risk Assessment is a comprehensive study which intends to evaluate the expected vulnerabilities, risks and losses due to different hazardous events; both natural or man-induced. |
| Multi Hazards | The term Multi Hazards, as the name would suggest, are the hazards evolved from multiple sources, either inter-related or independent phenomena, and are subject to joint probability theory and analysis. |

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| National Authority | National Authority means National Disaster Management Authority (NDMA). |
| Natural Disasters | Events which are caused purely by natural phenomena such as earthquakes, floods, cyclones etc. |
| Nullah | A Pakistani term, used for small rivers a streams carrying fresh water or sewerage disposal. |
| Performance Indicator | A variable that allows the verification of changes in the development intervention or shows results relative to what was planned. |
| Physical / Structural Vulnerability | The measure of the fragility structure, engineered or non-engineered, and its associated susceptibility to the natural stresses such as earthquake, flood etc. |
| Piedmont | Piedmont, in geology, landform created at the foot of a mountain or mountains by debris deposited by shifting streams. |
| Population Growth Rate | The growth rate is the rate at which a population is increasing (or decreasing) in a given year. |
| Population Projections | Population Projections are estimates of population number typically based on an estimated population consistent with most recent decennial census and are produced using cohort-component method. |
| Precipitation | Precipitation is the water that falls from the clouds towards the ground, especially as rain or snow. |
| Preparedness | Activities and measures taken in advance to ensure effective response to the impact of hazards, including the issuance of timely and effective early warnings and the temporary evacuation of people and property from threatened locations. |
| Prevention | Activities to ensure complete avoidance of the adverse impact of hazards. |
| Primary Healthcare | The primary care facilities include Basic Health Units (BHUs) and Rural Health Centers (RHCs) mainly preventive, outpatient and basic inpatient care. |
| Primary School | A primary school is an education facility in which children receive primary or elementary education, coming after preschool and before secondary school. |
| Quality Assurance | Quality assurance encompasses any activity that is concerned with assessing and improving the merit or the worth of a development intervention or its compliance with given standards. Note: examples of quality assurance activities include appraisal, RBM, reviews during implementation, evaluations, etc. |
| Range Lands | Range Lands are vast natural landscapes grasslands, shrub lands and wood lands. |
| Recovery | Decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk. |
| Relative Humidity | The amount of water vapour present in air expressed as a percentage of the amount needed for saturation at the same temperature. |
| Reliability | Consistency or dependability of data and evaluation judgments, with reference to the quality of the instruments, procedures and analyses used to collect and interpret evaluation data. |
| Relief / Response | The provision of assistance during or immediately after a disaster to meet the life preservation and basic subsistence needs of those people affected. It can be of an immediate, short-term, or protracted duration. |
| Residual Risk | The risk that remains in unmanaged form, even when effective disaster risk reduction measures are in place, and for which emergency response and recovery capacities must be maintained. |
| Resilience | The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. |
| Retrofitting | Reinforcement of existing buildings and structures to become more resistant and resilient to the forces of natural hazards. |
| Risk | The combination of the probability of an event and its negative consequences. |
| Risk Assessment | A methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend. |
| Risk Management | The systematic approach and practice of managing uncertainty to minimize potential harm and loss. |
| Risk Transfer | The process of formally or informally shifting the financial consequences of particular risks from one party to another whereby a household, community, enterprise or state authority will obtain resources from the other party after a disaster occurs, in exchange for ongoing or compensatory social or financial benefits provided to that other party. |

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| River | A river is a natural waterway, usually freshwater, flowing toward lower level of water surface such as a lake, a sea, or another river. |
| Riverine Flood | Flood is a phenomenon of inundation by water coming from a river, drainage or other water bodies, such as lakes or seas due to overflowing from ordinary boundary between land and water or water surging. |
| Rural Area | A rural area is an open area that has very low population and building density. Generally rural areas are away from cities/towns and its inhabitants are mostly linked with agriculture based livelihood. |
| Rural Health Centre (RHC) | The RHCs have 10-20 inpatients beds and each serves a catchment population of up to 100,000 people. The RHC provides promotive, preventive, curative, diagnostics and referral services along with inpatient services. The RHC also provides clinical, logistical and managerial support to the BHUs, LHWs, MCH Centers, and Dispensaries that fall within its geographical limits. RHC also provides medico-legal, basic surgical, dental and ambulance services. |
| Secondary Health Care | It is an intermediate level of health care that is concerned with the provision of specific technical, therapeutic or diagnostic services. It is the first referral level serving a district or a tehsil. Specialist consultation procedures and hospital admissions fall into this category of care. The role of a district hospital in primary health care has been expanded beyond being dominantly curative and rehabilitative to include promotional, preventive and educational roles as part of a primary health care approach. |
| Secondary School or Higher School | Secondary Schools are the schools which provide education from grade 8 till Intermediate Level, i.e. 12 th Grade or FSc. |
| Sedimentary Rocks | Sedimentary rocks are types of rock that are formed by the deposition and subsequent cementation of that material at the Earth's surface and within bodies of water. |
| Slope Failure | In this phenomenon, a slope abruptly collapses when the soil that has already been weakened by moisture in the ground loses its self-cohesiveness under the influence of rain or an earthquake. Due to sudden collapse, many people fail to escape if it occurs near a residential area, thus leading to a higher rate of fatalities. |
| Social Vulnerability | Characteristics of social systems that create the potential for harm or loss to it |
| Steppe Climate | A semi-arid climate or steppe climate is the climate of a region that receives precipitation below potential evapotranspiration, but not as low as a desert climate. |
| Storm Surge | A Storm Surge is phenomena of sea level rise associated with a low-pressure weather system, typically a tropical cyclone. Therefore, an early warning plan for "storm surge" should be incorporated with that of "cyclone". |
| Streambed | A stream bed is the channel bottom of a stream or river, the physical confine of the normal water flow |
| Structural / Non-Structural Measures | Structural measures refer to any physical construction to reduce or avoid possible impacts of hazards, which include engineering measures and construction of hazard-resistant and protective structures and infrastructure. Non-structural measures refer to policies, awareness, knowledge development, public commitment, and methods and operating practices, including participatory mechanisms and the provision of information, which can reduce risk and related impacts. |
| Sustainable Development | Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and the future needs. (Brundtland Commission, 1987) |
| Tehsil Head Quarter (THQ) | These hospitals are located at each THQ and serves a population of 0.5 to 1.0 million. At present majority of THQ hospitals have 40 to 60 beds. The THQ hospital provides promotive, preventive, curative, diagnostics, in patients, referral services and also specialist care. THQ hospitals are supposed to provide basic and comprehensive Emergency Obstetric and New born Care (EmONC). THQ hospital provides referral care to the patients including those referred by the Rural Health Centers, Basic Health Units, Lady Health Workers and other primary care facilities. |
| Tertiary Healthcare | Tertiary care hospitals are located in the major cities for more specialized inpatient care. Tertiary care is specialized consultative health care, usually for inpatients and on referral from a primary or secondary health professional. |
| Tsunami | A tsunami is a series of waves in a water body caused by the displacement of a large volume of water, generally in an ocean or a large lake. Earthquakes, volcanic eruptions and other underwater explosions, landslides, avalanche, meteorite impacts and other disturbances above or below water all have the potential to generate a tsunami. |
| Unemployment | The "unemployed" comprises all the persons ten years of age and above who during the reference period were without work, currently available for work and are seeking work. |
| Urban Area | An Urban area is human settlement with high population density and infrastructure of built environment. Urban areas are created through urbanization and are categorized by urban morphology as cities, towns, conurbations and suburbs. |
| Urban Flood | Flood and inundation phenomena occurring in the city or built-up areas. |

Veterinary Facility

It refers to the availability of veterinary facilities for livestock with qualified veterinarian (Doctor / Assistant) for provision of medical facilities for farm animals.

Vulnerability

The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

Wet Areas

Areas which are naturally covered with fresh or saline water such as river and lakes are grouped in this class.

Wheat Procurement Centre

These centres are established every year at the time of wheat harvest in surplus wheat producing areas particularly of the Punjab and Sindh provinces by the Provincial Food Departments and or Pakistan Agricultural Services and Storage Corporation (PASSCO) at appropriate locations. These centres are not permanent in nature and their number in a tehsil / district varies on year to year basis depending upon the procurement policy.

LIST OF ACRONYMS

| | | | |
|----------------|--|----------------|---|
| AMS | Assistant Medical Superintendent | MOVERE | Mobilization of Volunteer for Emergency Response Exercise |
| APWMO | Assistant Principal Women Medical Officer | MPE | Most Probable Earthquake |
| AWO | Automatic Weather Observation | MS | Medical Superintendent |
| AWS | Automatic Weather Station | MSSP | Micro Seismic Study Program (Pakistan Atomic Energy Commission) |
| C&W | Communication & Works | MM | Moment Magnitude |
| CBDRM | Community Based Disaster Risk Management | NARC | National Agricultural Research Center |
| CBEWS | Community-Based Early Warning System | NCEG | National Center of Excellence in Geology |
| CMO | Casualty Medical Officer | NDI | NOAA Drought Index |
| CRI | Composite Risk Index | NDMA | National Disaster Management Authority |
| DC | Deputy Commissioner | NDMC | National Disaster Management Commission |
| DCO | District Coordination Officer | NDMP | National Disaster Management Plan |
| DDMA | District Disaster Management Authority | NDMP-SC | Steering Committee for National Disaster Management Plan |
| DDRMP | District Disaster Risk Management Plan | NDRIS | National Disaster Risk Information System |
| DEWS | Disease Early Warning System | NDVI | Normalized Difference Vegetation Index |
| DHQ | District Headquarter Hospital | NDWI | Normalized Difference Water Index |
| DM | Disaster Management | NEOC | National Emergency Operations Centre |
| DMS | Deputy Medical Superintendent | NFPP | National Flood Protection Plan |
| DRR | Disaster Risk Reduction | NHA | National Highway Authority |
| DSHA | Deterministic Seismic Hazard Assessment | NHEPRN | National Health Emergency Preparedness and Response Network |
| ENT | Ear, Nose, Throat | NIDM | National Institute of Disaster Management |
| EPI | Expanded Program on Immunization | PARC | Pakistan Agricultural Research Council |
| EWS | Early Warning System | PASSCO | Pakistan Agricultural Services and Storage Corporation |
| PDMA | Provincial Disaster Management Authority | PBC | Pakistan Broadcasting Corporation |
| FFC | Federal Flood Commission | PBS | Pakistan Bureau of Statistics |
| FGD | Focus Group Discussion | PCIW | Pakistan Commissioner for Indus Waters |
| GIS | Geographic Information System | PCRWR | Pakistan Center for Research on Water Resources |
| GLOF | Glacial Lake Outburst Flood | PDMA | Provincial Disaster Management Authority |
| GMPE | Ground Motion Prediction Equation | PDSI | Palmer Drought Severity Index |
| GOERE | Government Officer Emergency Response Exercise | PGA | Peak Ground Acceleration |
| GPS | Global Positioning System | PHDI | Palmer Hydrological Drought Severity Index |
| GSP | Geological Survey of Pakistan | PIPD | Provincial Irrigation and Power Department |
| HFA | Hyogo Framework for Action | PMD | Pakistan Meteorological Department |
| HTC | Hydro-Thermal Coefficient | PMO | Principal Medical Officer |
| INGOs | International Non-governmental Organizations | PMU | Project Management Unit |
| LSWI | Land Surface Water Index | PRA | Participatory Risk Assessment |
| M&E | Monitoring and Evaluation | PSC | Project Steering Committee |
| MBT | Main Boundary Thrust | PSHA | Probabilistic Seismic Hazard Assessment |
| MCE | Maximum Considered Earthquake | PTA | Pakistan Telecommunication Authority |
| MGDs | Millennium Development Goals | PTCL | Pakistan Telecommunication Company Limited |
| MHVRA | Multi Hazard Vulnerability and Risk Assessment | PTWC | Pacific Tsunami Warning Center |
| MKT | Main Karakorum Thrust | PWMO | Principal Women Medical Officer |
| MMT | Main Mantle Thrust | | |
| MO | Medical Officer | | |

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| R&D | Research and Development | TMA | Tehsil Municipal Administration |
| RDMC | Regional Drought Monitoring Centre | UC | Union Council |
| RP | Return Period | UN | United Nations |
| SFDRR | Sendai Framework for Disaster Risk Reduction | VCI | Vegetation Condition Index |
| SMA | Soil Moisture Anomaly | VegDRI | Vegetation Drought Response Index |
| SMDI | Soil Moisture Deficit Index | VIC | Variable Infiltration Capacity |
| SMO | Senior Medical Officer | WAPDA | Water and Power Development Authority |
| SMRFC | Specialized Medium Range Forecasting Centre | WASA | Water and Sanitation Agency |
| SOP | Survey of Pakistan | WFP | World Food Program |
| SoVI | Social Vulnerability Index | WHO | World Health Organization |
| SPEI | Standardized Precipitation Evapotranspiration | WMO | World Meteorological Organization |
| SPI | Standard Precipitation Index | WMO | Women Medical Officer |
| SPI | Stream Power Index | WOE | Weight of Evidence (Statistical Model) |
| SPT | Standard Penetration Test | WRF | Weather Research and Forecast (Name of Numerical Calculation Model) |
| SRSI | Standardized Reservoir Supply Index | | |
| SSFI | Standardized Stream Flow Index | | |
| SSI | Semi Structured Interviews | | |
| SUPARCO | Pakistan Space and Upper Atmospheric Research Commission | | |
| SWI | Standardized Water-Level Index | | |
| SWMO | Senior Women Medical Officer | | |
| SWS | Soil Water Storage | | |
| SWSI | Surface Water Severity Index | | |
| SWSI | Surface Water Supply Index | | |
| TCI | Temperature Condition Index | | |
| THQ | Tehsil Headquarter Hospital | | |

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A

**BASELINE
INFORMATION**

Bahawalpur is an important district of Punjab. Its capital is Bahawalpur City. It is located to the south of Sutlej River and lies in the Cholistan Region near the Thar Desert. It is situated about 100 km from Multan, 420 km from Lahore and 270 km from Faisalabad. The district was once the capital of the former princely state of Bahawalpur, homed various Nawabs (Kings) and counted as part of the Rajputana states (now Rajasthan, India). The district is known for its famous palaces such as the Noor Mahal, Sadiq Ghar Palace, Darbar Mahal as well as the ancient fort of Derawar located in the Cholistan Desert bordering India. Bahawalpur is also located near the historical and ancient cities of Uch and Harappa which were once the stronghold of Delhi Sultanate and Indus Valley Civilization. The district is also home to one of the few natural safari parks in the country i.e. Lal Suhanra National Park. Saraiki is the local language, while Urdu and English are official languages used in various educational and government institutions of the district. The local economy and livelihood are mainly agriculture with a good yield of different cash crops along with production of fruits. Industrial sector is also functional and furnishing here.

History

Bahawalpur originally was a vassal of the great Sikh empire built by Maharajah Ranjeet Singh. In 1936 Bahawalpur stopped paying tribute and openly declared independence. In the Anglo Sikh wars Bahawalpur supported the British and this guaranteed its survival. The founder of the State of Bahawalpur was Nawab Bahawal Khan Abbasi I. The Abbasi family ruled over the State for more than 200 years (1748 to 1954). During the rule of the last Nawab Sir Sadiq Muhammad Khan Abbasi V, Bahawalpur State was merged with Pakistan. During the 1960's (1954) the Nawab agreed (Agreement Dated 3rd October, 1947) for Bahawalpur to be absorbed into modern Pakistan. He was however given special privileges including the right to import several cars duty free each year. Bahawalpur was formerly the capital of the state and now is the District and Divisional Headquarters of Bahawalpur Division.

The Nawabs of Bahawalpur originally came from Sindh; they formed a princely state and assumed independence in 1802.

The City, which lies just south of the Sutlej River, was founded in 1748 by Muhammad Bahawal Khan and was incorporated as a municipality in 1874. It is the site of the Adam wahan (Empress) Bridge, the only Railway Bridge over the Sutlej River in Pakistan, and has rail links with Peshawar and Karachi.

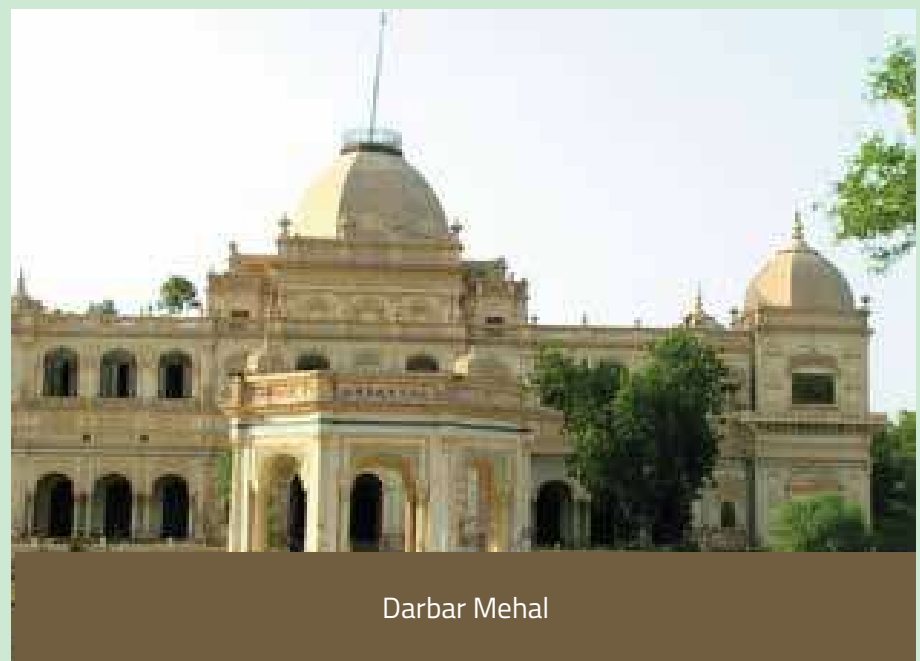
The region surrounding Bahawalpur to the west, called the Sindh, is a fertile alluvial tract in the Sutlej River valley that is irrigated by floodwaters, planted with groves of date palms, and thickly populated. The chief crops are wheat, gram, cotton, sugarcane, and dates. Sheep and cattle are raised for export of wool and hides. East of Bahawalpur is the Pat, or Bar, a tract of land considerably higher than the adjoining valley. It is chiefly desert irrigated by the Sutlej inundation canals and yields crops of wheat, cotton, and sugarcane. Farther east, the Rohi, or Cholistan, is a

barren desert tract, bounded on the north and west by the Hakra depression with mound ruins of old settlements along its high banks; it is still inhabited by nomads. The principal inhabitants of the region surrounding Bahawalpur are Jat and Baluchi peoples. There are many historical sites in the area, including Uch, southwest of Bahawalpur, an ancient town dating from Indo-Scythian (Yüeh-chih) settlement (c. 128 BC to AD 450). Pop. (1981) City, 180,263; (1981 prelim.) metropolitan area, 695,000.

Bahawalpur is also an important agricultural training and educational center. Soap making and cotton ginning are important enterprises; cotton, silk, embroidery, carpets, and extraordinarily delicate pottery are produced. Factories producing cottonseed oil and cottonseed cake were built in the 1970s. It is an important marketing center for the surrounding areas and is located on the crossroads between Peshawar, Lahore, Quetta and Karachi. Bahawalpur is also known for its distinctly embroidered slippers and shoes and the filigree pottery which is made here.

The City is located favorably for commerce, lying at the junction of trade routes from the east, south-east, and south. It is a center for trade in wheat, cotton, millet, and rice grown in the surrounding region. Dates and mangoes are also grown here. Canals supply water for irrigation. The principal industries are cotton ginning, rice and flour milling, and the hand weaving of textiles.

Sutlej (Chinese, Langqên Zangbo or Xiangquan He; Indian, Satlej), chief tributary of the Indus River. It rises in Tibet, flows south-west through Himachal Pradesh State, India, and then passes through the great arid plains of Punjab Province, Pakistan, joining the Indus after a course of about 1,450 km (900 mi.). The Sutlej is the south-easternmost of the five rivers of the Punjab, the other four being its two main tributaries, the Beâs and the Chenab, together with two branches of the latter. Below the confluence of the Beâs, the river is sometimes called the Ghara, and its lowest course, after receiving the Chenab, is called the Panjnad ("five rivers").



Darbar Mehal

Land Scape

Bahawalpur district comprises dynamic landscapes that include irrigated portions and a vast area of Cholistan desert, covering approximately two-thirds of the district. The main crops of the district are cotton, sugarcane, wheat, sunflower seeds, rape mustard seeds and rice. Citrus, Mangoes, dates and guavas are some of the exports from the district. Bahawalpur comprises of five tehsils: Bahawalpur, Ahmedpur East, Hasilpur, Khairpur Tamewali and Yazman. The district headquarter is located at Bahawalpur. The district hosts one of the few natural safari parks of Pakistan; the Lal Suhanra National Park.

Culture

Bahawalpur has a rich heritage and is an important hot spot for historians as well as archeologists. Bahawalpur is known for its cotton, silk, embroidery, carpets, and extraordinarily delicate pottery. The Punjab Small Industries Corporation (PSIC) has established a Craft Development Center for Cholistan area, outside Farid Gate, Bahawalpur from where handicrafts manufactured in Cholistan can be purchased. Some of the souvenirs produced in the city include:

- ✓ Flassi - 4 ft by 7 ft, made of camel hair and cotton yarn; it is used for wall hanging, as a decoration piece and a carpet.
- ✓ Gindi or Rilli - Made of small pieces of many colors of cotton cloth and needlework; they can be used as wall hangings, bed covers, carpets and blankets.
- ✓ Changaries - Like big plaques, these are made of palm leaves in different bright colours with beautiful patterns and geometric designs. These are used for keeping the 'chapattis' and also as a wall decoration.
- ✓ Khalti - Like a purse embroidered on top with multicoloured threads.
- ✓ Artwork - An attractive type of embroidery done on dupatta, kurta and chaddar, etc.

The main shopping centers of Bahawalpur are Shahi Bazaar, Machli Bazaar, Farid Gate and the Mall. The commercial area in Satellite Town is a newly developed center that is gaining popularity. A few shopping malls, including Bobby Plaza, Takbeer Shopping Mall, Time, and Prince, cater for all kinds of needs. Shopping is a major attraction in the city; the city is bustling with traders and craftsmen selling all sorts of artwork for travellers and tourists.

East of Bahawalpur is the Cholistan Desert which extends into the Thar Desert of India. The region was once watered by the Hakra River known as the Saravati in vedic times. At one time there were 400 forts in the area and archaeological finds around the Derawar Fort, the only place with a perennial waterhole, indicate that it was contemporaneous with the Indus Valley Civilization. The average annual rainfall is only 12 cm, and the area's scant cultivation is made possible by underground wells, drawn up by camels. The water is stored in troughs, built by the tribes, between sandhills and din waterholes called tobas. The people are racially similar to those in Rajasthan - tall, with sharp features. They live in large, round, mud and grass huts, usually built on the top of sandhills. On the whole, they are pastoral and nomadic. The main tribes are the Chachar, Mehr, Lar, Paryar, Channar, Chandani and Bohar. The forts here were built at 29 km intervals, which probably served as guard posts for

the camel caravan routes. There were three rows of these forts. The first line of forts began from Phulra and ended in Lera, the second from Rukhanpur to Islamgarh, and the third from Bilcaner to Kapoo. Built with double walls of gypsum blocks and mud, they are all in ruins now. Some of them date back to 1000 BC, and were destroyed and rebuilt many times.

Even with all the markets and forts, one thing for which Bahawalpur is recognised above all others is the numerous palaces that still remain intact ever since the fall of the Nawabs. There are countless palaces in the city, locally known as Mahals. Some of the most famous include: Noor Mahal, Gulzar Mahal, Darbar Mahal, Shimla Khoti Sadiq Ghar Palace and Darbar Mahal. The city also has a city gate called Farid Gate, which in its heyday provided the only entrance to the city for its rulers. The gate still remains and is now located in a busy market in the inner city. The Bahawalpur Museum and Bahawalpur National Library house various collections of coins, medals, postage stamps of the former state of Bahawalpur, manuscripts, documents, inscriptions, wood carvings, camel skin paintings, historical models and stone carvings from Islamic and pre-Islamic eras. There is a complete set of medals of all classes issued by the ex-state to its military officers, civilians, and other important citizens of the ex-state.



Cultural Dance



Traditional Cloth Weaving

Languages

Inhabitants of Bahawalpur district speak Languages which include:

- ✓ Saraiki
- ✓ Urdu
- ✓ Punjabi

Traditional Crafts

THAAP is working in Bahawalpur District for poverty alleviation for this THAAP- CRAFT seeks to create livelihood opportunities for the people who don't have job and have marginalized crafts communities and engendered pride in cultural heritage and expressions of the people of that area. As there is rich craft traditions in Pakistan so people are working close to THAAP Culture and Development programs for purpose of marketing the products and crafts persons and currently working with the women collectives established as pilots in Bahawalpur District.



Notable People

- ✓ Ajaz Akhtar, Cricketer
- ✓ Art Malik, British TV and Film Actor
- ✓ Azam Cheema, Muslim Ideology Lover
- ✓ Motiullah, Field Hockey Player
- ✓ Murtaza Hussain, Cricketer
- ✓ Noshi Gillani, Urdu Language Poet
- ✓ Shabbir Ahmad Usmani, Muslim Sufi and Scholar
- ✓ Zaka Ashraf, PCB Chairman
- ✓ Zia Ahmad, Cricketer

Tourist Attraction

- ✓ Uch Sharif
- ✓ Darbar Mahal
- ✓ Abbasi Mosque
- ✓ Noor Palace
- ✓ Sadiq Garh Palace
- ✓ Central Library of Bahawalpur





DISTRICT BAHAWALPUR AT A GLANCE

Geography

Location



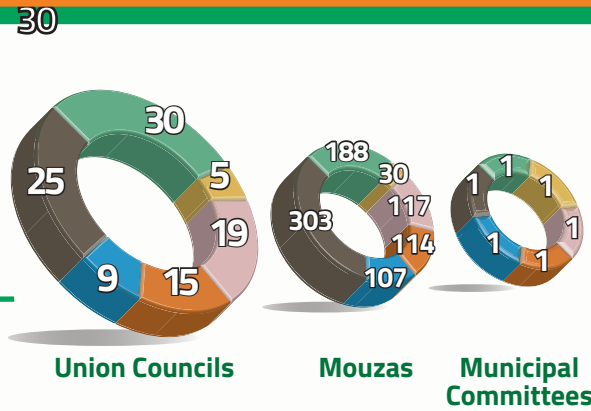
Lat: 29° 23' 44.6" North
Long: 71° 40' 60" East

Neighbouring Districts

- North**
Bahawalnagar, Vehari, Lodhran and Multan
- East**
Bahawalnagar
- West**
Rahim Yar Khan, Muzaffargarh & Sindh
- South**
India

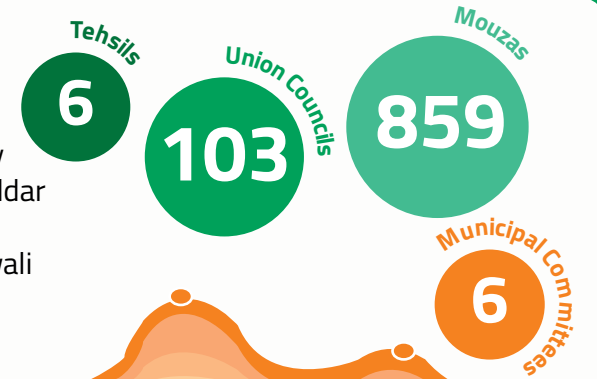
Administrative Setup

| | |
|-----------------------|----------------------------|
| Area | 23,952.2 sq.km |
| District Capital | Bahawalpur City |
| Language | Saraiki, Punjabi |
| Elevation to District | 14 th Oct, 1955 |



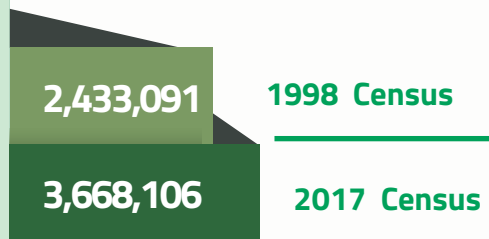
Tehsils

- Ahmadpur
- Bahawalpur City
- Bahawalpur Saddar
- Hasilpur
- Khairpur Tamewali
- Yazman

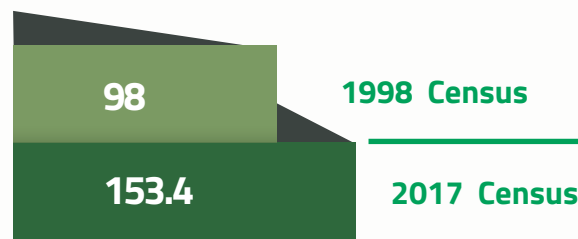


Population Distribution

Total Population in District



Population Density (Person per sq.km)



1.96%
(2017 Census)

Growth Rate

3.08%
(1998 Census)



Educational Facilities

| Govt. Schools | Priv. Schools | Colleges | Universities |
|---------------|---------------|----------|--------------|
| 1,940 | 134 | 12 | 2 |



Public Health Care Facilities (Numbers)



Tourist Attractions



Picnic Resort

Gulzar Mahal, Panjand head, Dera Nawab Sahib, Forts, Lal Suhanra National Park, Uch Sharif, Mosque, Central Library



Historical Sites

Mahal Abbasi Mosque, Noor Palace, Sardiq Garh Palace, Central Library of Bahawalpur

Agriculture

Major Crops

Cotton, Wheat, Sugarcane, Rape/Mustard Seeds. Besides Rice, Gram, Tobacco, Jawar, Baja, Moong, Mash, Masoor, Maize

Major Fruits

Mangoes, Citrus, Dates and Guava. Besides pomegranate, Jaman and Phalsa

Major Vegetables

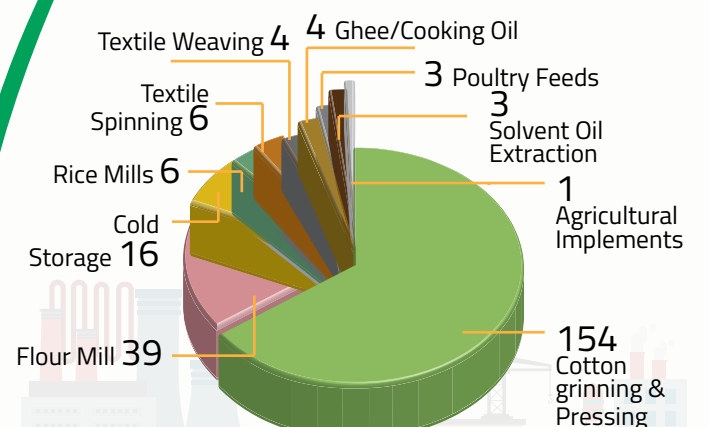
Onion, Tomato, Potatoes, Brinjal, Carrot, Cauliflower, Bottle Gourd

Major Livestock

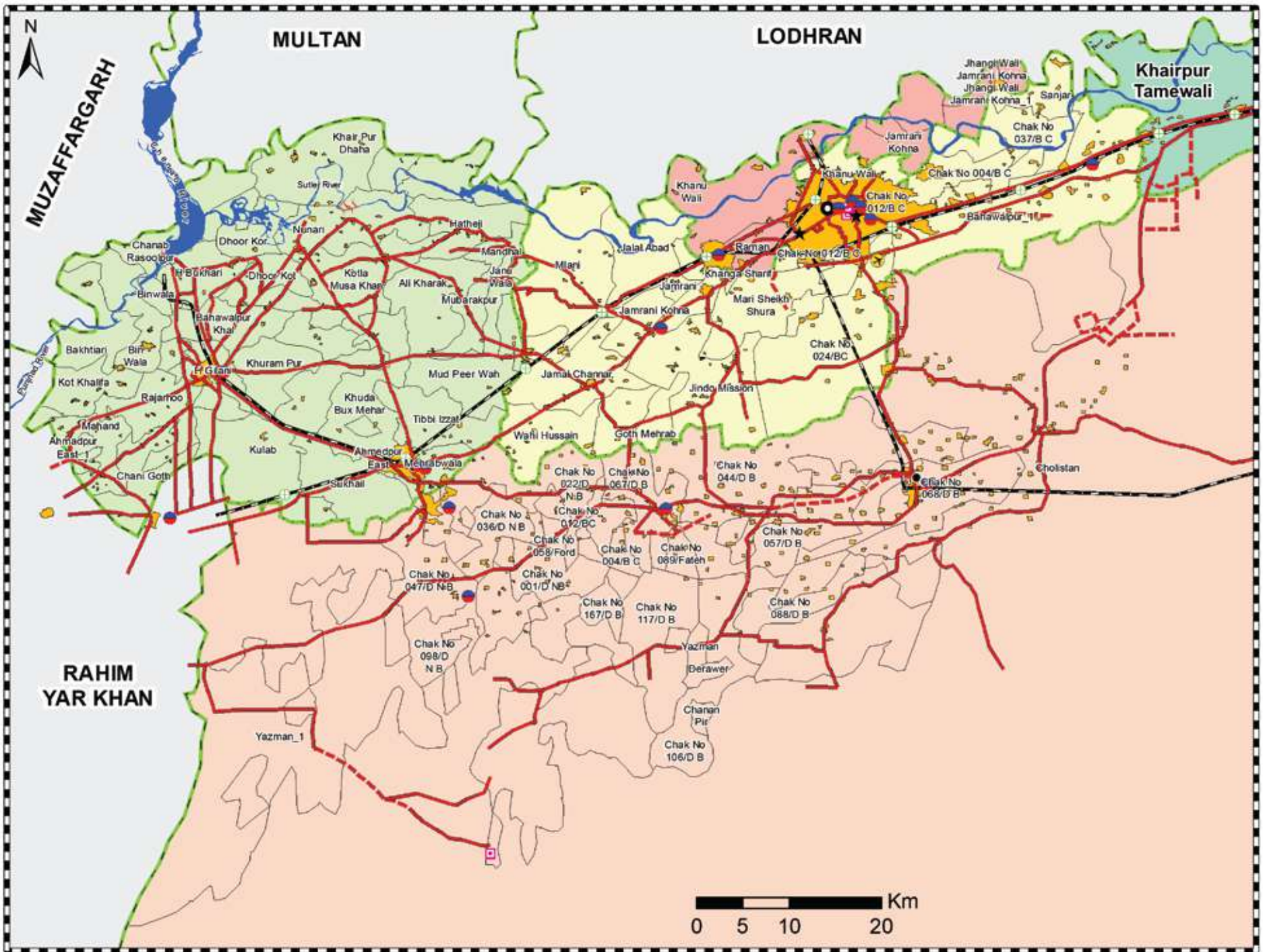
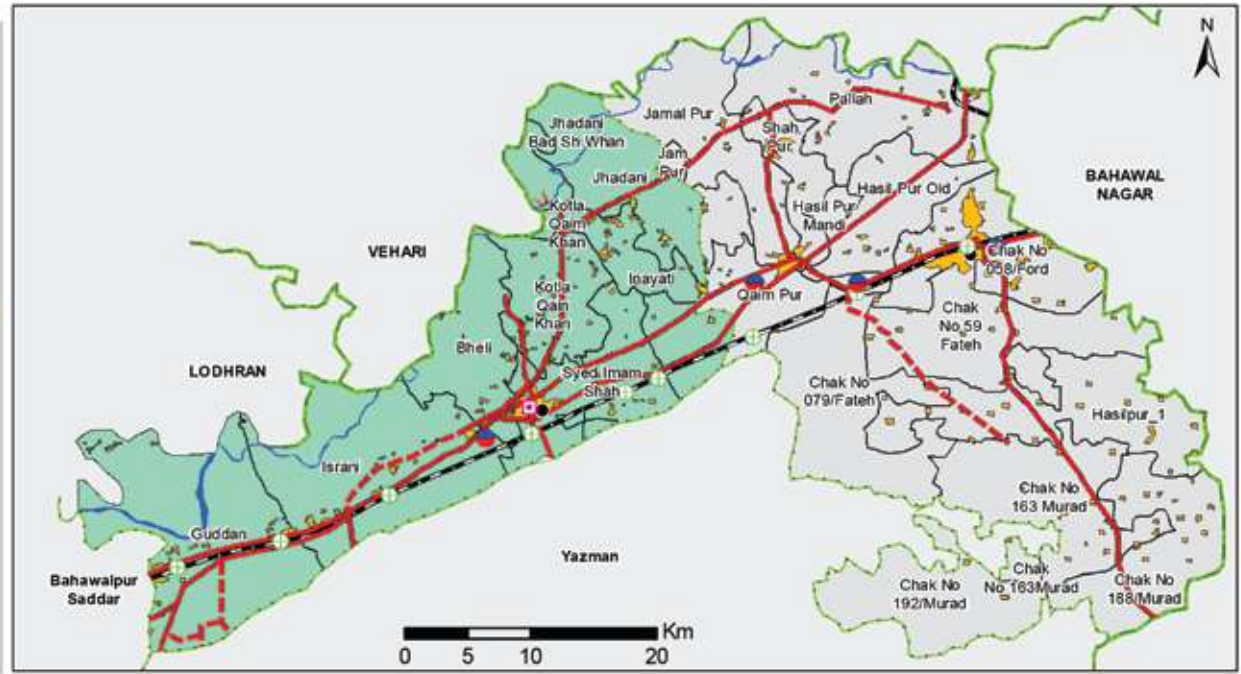
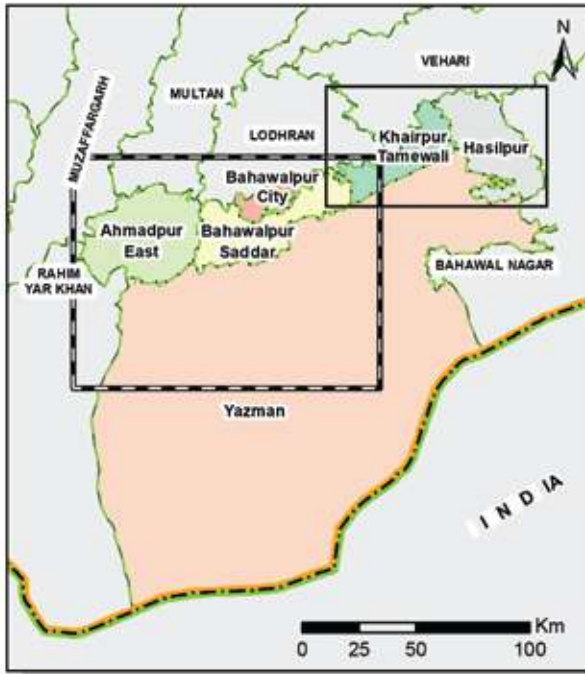
Cattle, Buffaloes, Sheep and Goats



Major Industries



DISTRICT ADMINISTRATIVE MAP



Legend

- | | | |
|-----------------------------|-----------------------------|--------------------------|
| ★ Rescue 1122 | — Other Gauge Railway Track | ■ Bahawalpur City |
| ● Police Station | — Motorway | ■ Bahawalpur Saddar |
| ✈ Airport | — Trunk/Highway | ■ Hasilpur |
| ✈ Air Field/Landing Strips | — Metalled | ■ Khairpur Tamewali |
| 🚂 Railway Station | — UnMetalled | ■ Yazman |
| 🏛 Archaeological Sites | — River and Water Body | ABC District Boundary |
| 🏠 District Headquarter | 🏠 Builtup Area | — Provincial Boundary |
| ● Tehsil Headquarter | 🏠 Union Council Boundary | — Line of Control |
| 🌉 Bridge | Tehsil Boundary | 🏠 International Boundary |
| — Broad Gauge Railway Track | ■ Ahmadpur East | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan



MAP INFORMATION

Data Source(s):
 Punjab Emergency Service - Rescue 1122
 Punjab Police
 Survey of Pakistan
 National Highway Authority

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-001
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

2 GEOLOGY

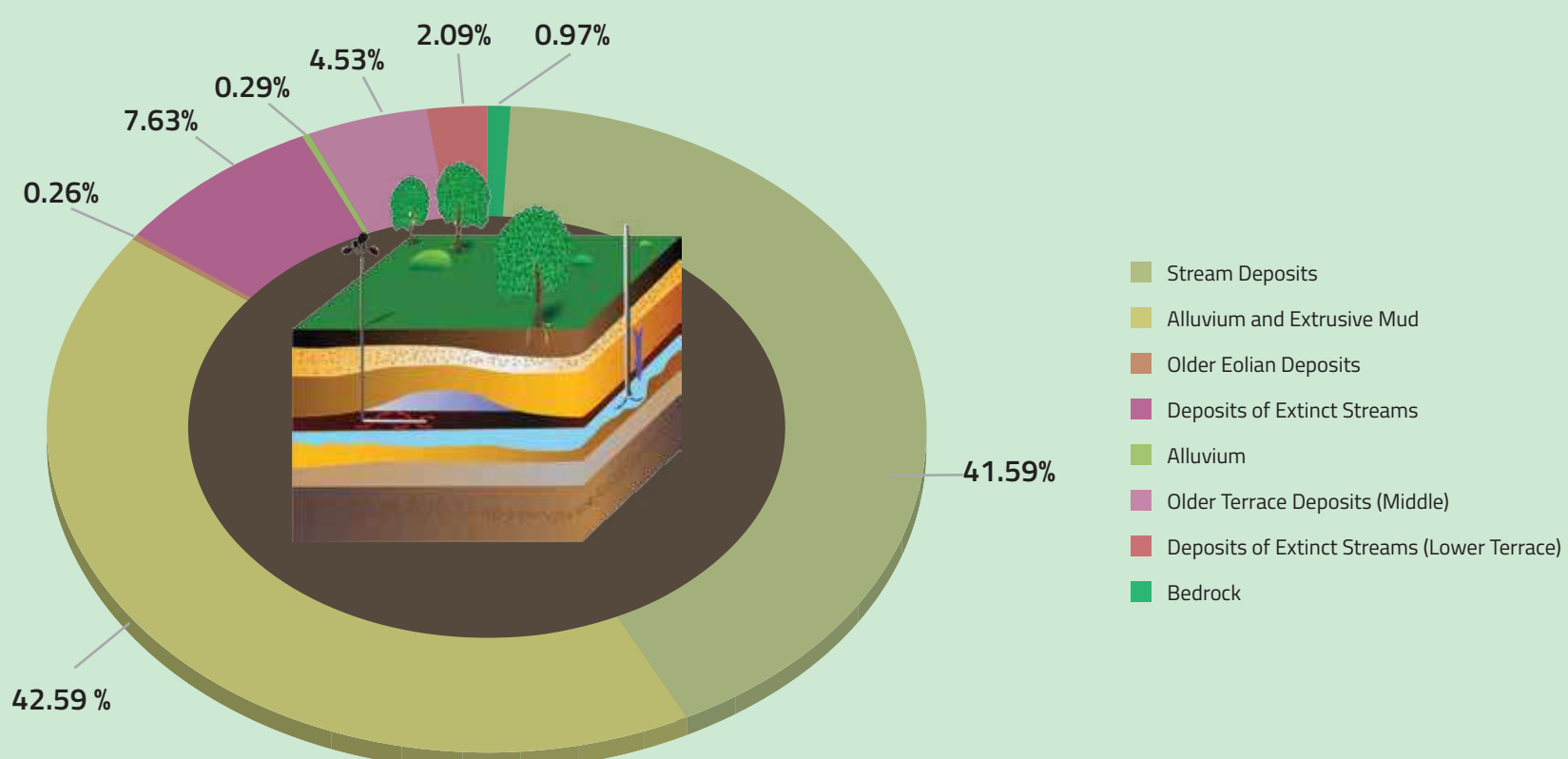


The surface geology of Bahawalpur is mainly composed Alluvium & Extrusive Mud and Older Eolian Deposits. Other geological composition of the district includes Stream Deposits, Alluvium, Older Terrace Deposits, Deposits of Extinct Streams and Bedrock.

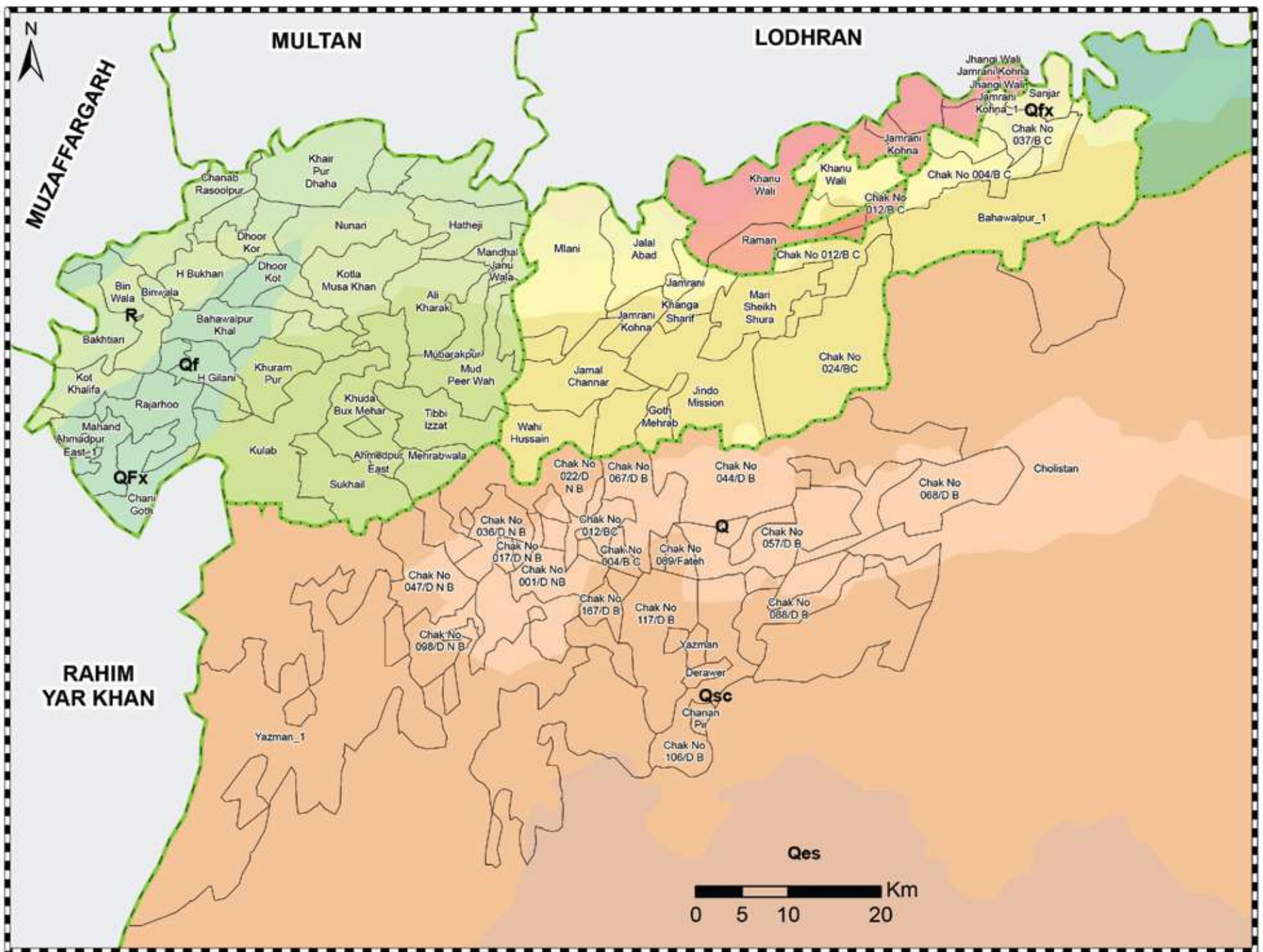
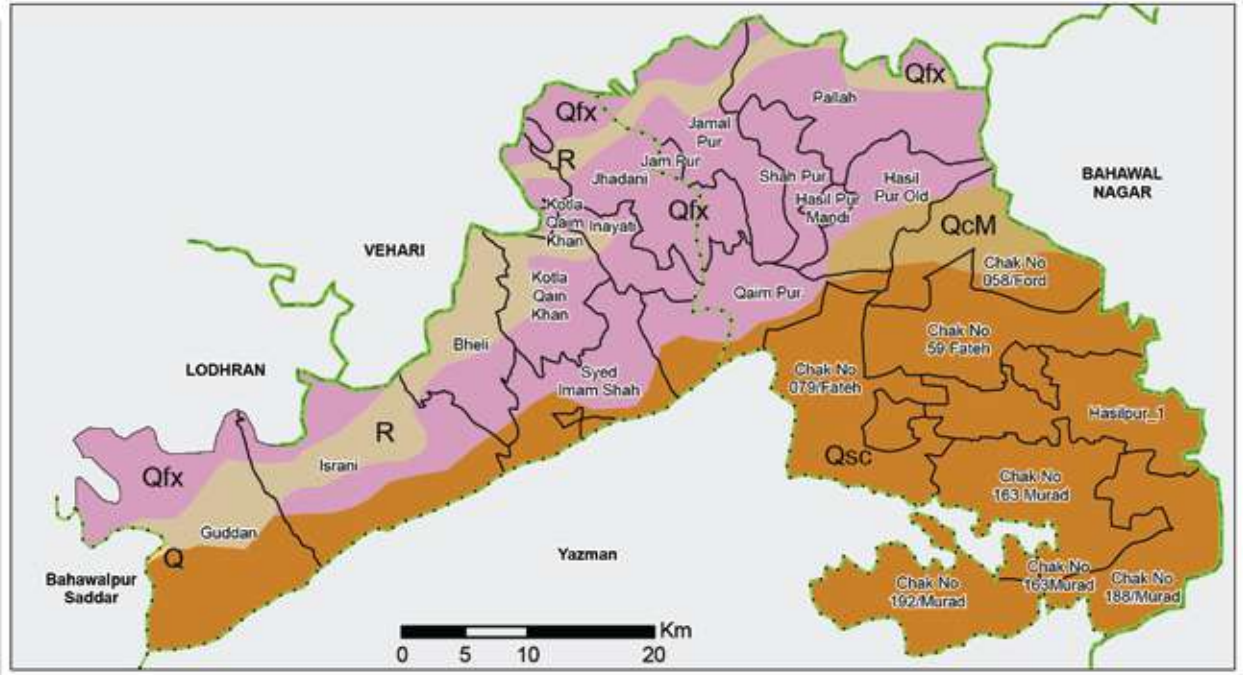
Bahawalpur district is a part of Indus basin and can be considered extension of Rajasthan Jaisalmer's Basin. The Pre-Cambrian crystalline basement is about 2-4 km deep, progressively increasing depth of westward and northward. The evaporates and the Pre-Cambrian basin have encountered in two wells with mixed lithology of clastics and carbonates, followed by Cambrian clastics and carbonates sequence of Cambrian age.

| Geological Formation | Area (sq.km) | Composition |
|---|-----------------|-------------|
| Stream Deposits | 233.8 | 0.97% |
| Alluvium and Extrusive Mud | 9961.8 | 41.59% |
| Older Eolian Deposits | 10201.3 | 42.59% |
| Deposits of Extinct Streams | 62.7 | 0.26% |
| Alluvium | 1828.5 | 7.63% |
| Older Terrace Deposits (Middle) | 70.9 | 0.29% |
| Deposits of Extinct Streams (Lower Terrace) | 1086.3 | 4.53% |
| Bedrock | 502.6 | 2.09% |
| | 23,947.9 | |

Geological Composition



GEOLOGY MAP



| Legend | | Tehsil Boundary | |
|--------|---|-----------------|------------------------|
| | Alluvium | | Ahmadpur East |
| | Alluvium and Extrusive Mud | | Bahawalpur City |
| | Bedrock | | Bahawalpur Saddar |
| | Deposits of Extinct Streams | | Hasilpur |
| | Deposits of Extinct Streams (Lower Terrace) | | Khairpur Tamewali |
| | Older Eolian Deposits | | Yazman |
| | Older Terrace Deposits (Middle) | | ABC District Boundary |
| | Stream Deposits | | Provincial Boundary |
| | Union Council Boundary | | Line of Control |
| | | | International Boundary |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan






MAP INFORMATION
 Data Source(s): Geological Survey of Pakistan, Survey of Pakistan, Pakistan Bureau of Statistics
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-004
 Prepared by: Project Management Unit, NDMA
 Last Updated: 20th April, 2017

3 LAND USE & LAND COVER

Land Cover (LC) is defined as the observed (bio) physical cover on the earth's surface, whereas Land Use (LU) is characterized by the arrangements, activities and inputs that people undertake in a certain land cover type in order to produce, change or maintain it. Knowledge of the LU/LC distribution helps Land Use Planners and Policy Makers to determine pragmatic and educated land use policies.

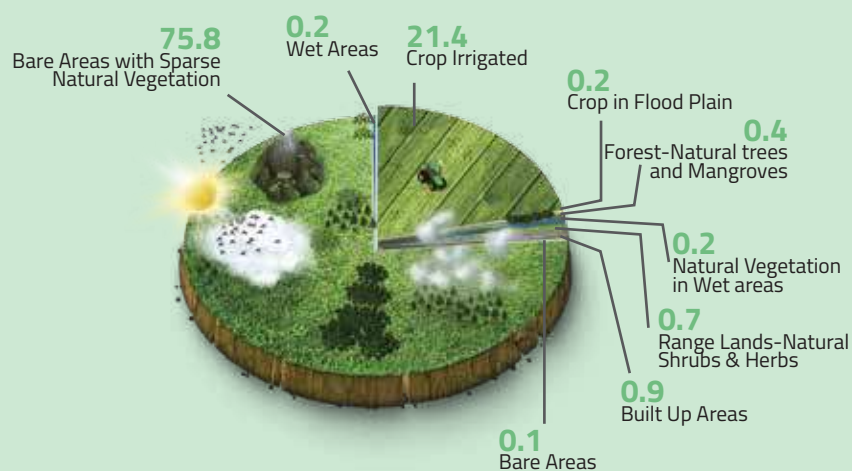
Land Cover/ Land Use (LULC) processes are important to be monitored since they are the direct drivers of Climate & Ecosystem Change. For this study, LU/LC demarcation carried out by Space & Upper Atmosphere Research Commission (SUPARCO) has been used which provides a comprehensive description of the biotic and abiotic resources of the study area and includes, inter alia, numerous categories of cultivated land; natural vegetation and non-vegetated areas including bare and

rocky areas, and areas of human settlement. In this study, Land Cover Classification System (LCCS) approach has been used with an aim to capture the physiographic characteristics down to a UC level.

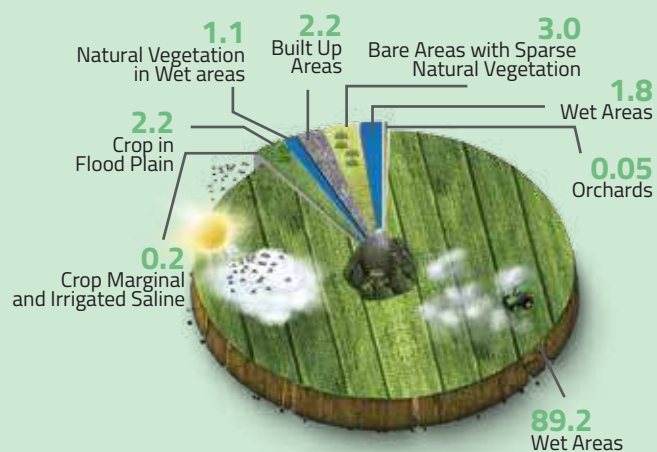
The geospatial database, prepared by SUPARCO, is used to provide basis for the development of an improved capacity for natural resources monitoring and management.

The legend consisting 13 main land cover classes have been used in this study which are being further subdivided into 36 classes, and have been mapped based on the analysis, interpretation and validation of SPOT -5 very high resolution satellite imagery. For this purpose, satellite images were segmented into homogeneous polygons and labeled using the LCCS classification system.

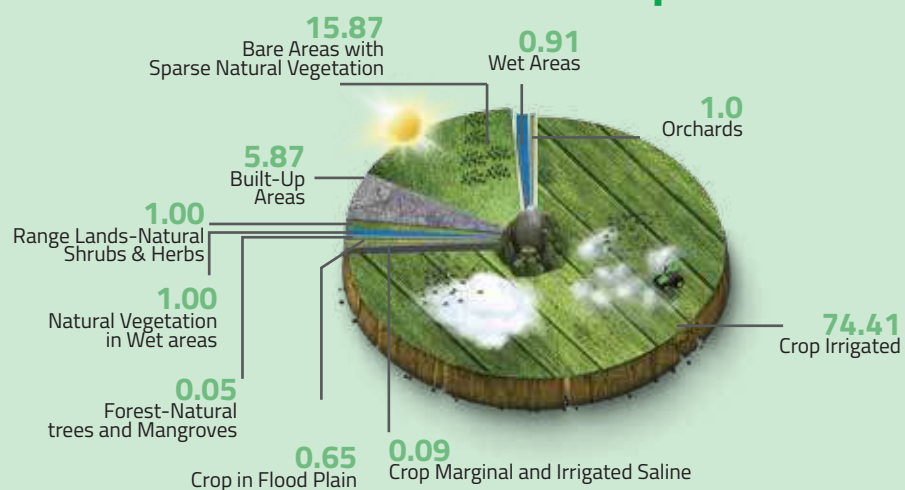
LAND COVER DISTRIBUTION (Percentage)



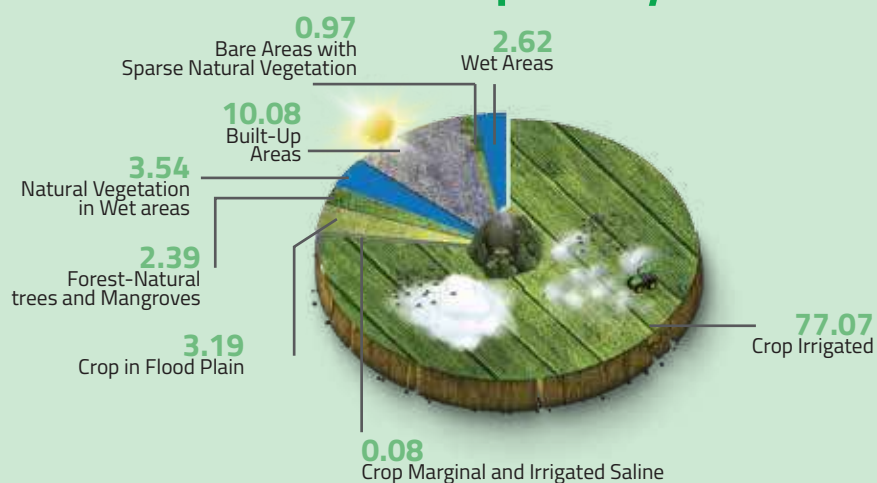
Tehsil Ahmedpur



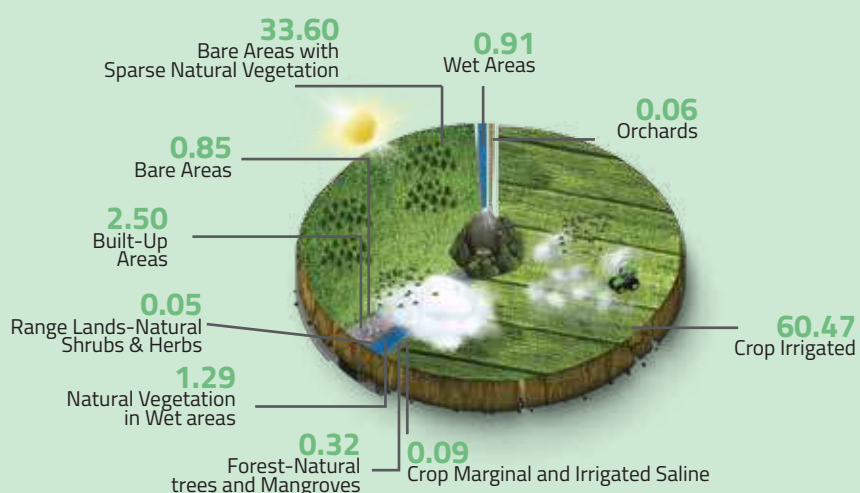
Tehsil Bahawalpur



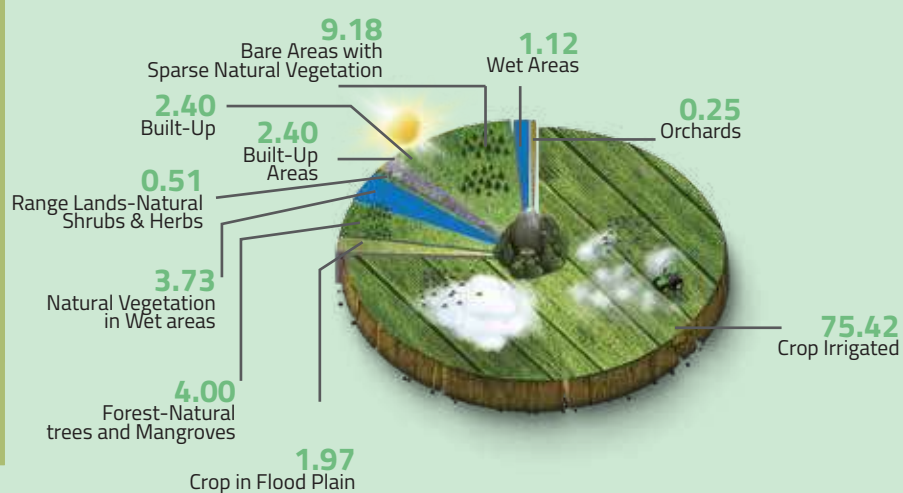
Tehsil Bahawalpur City



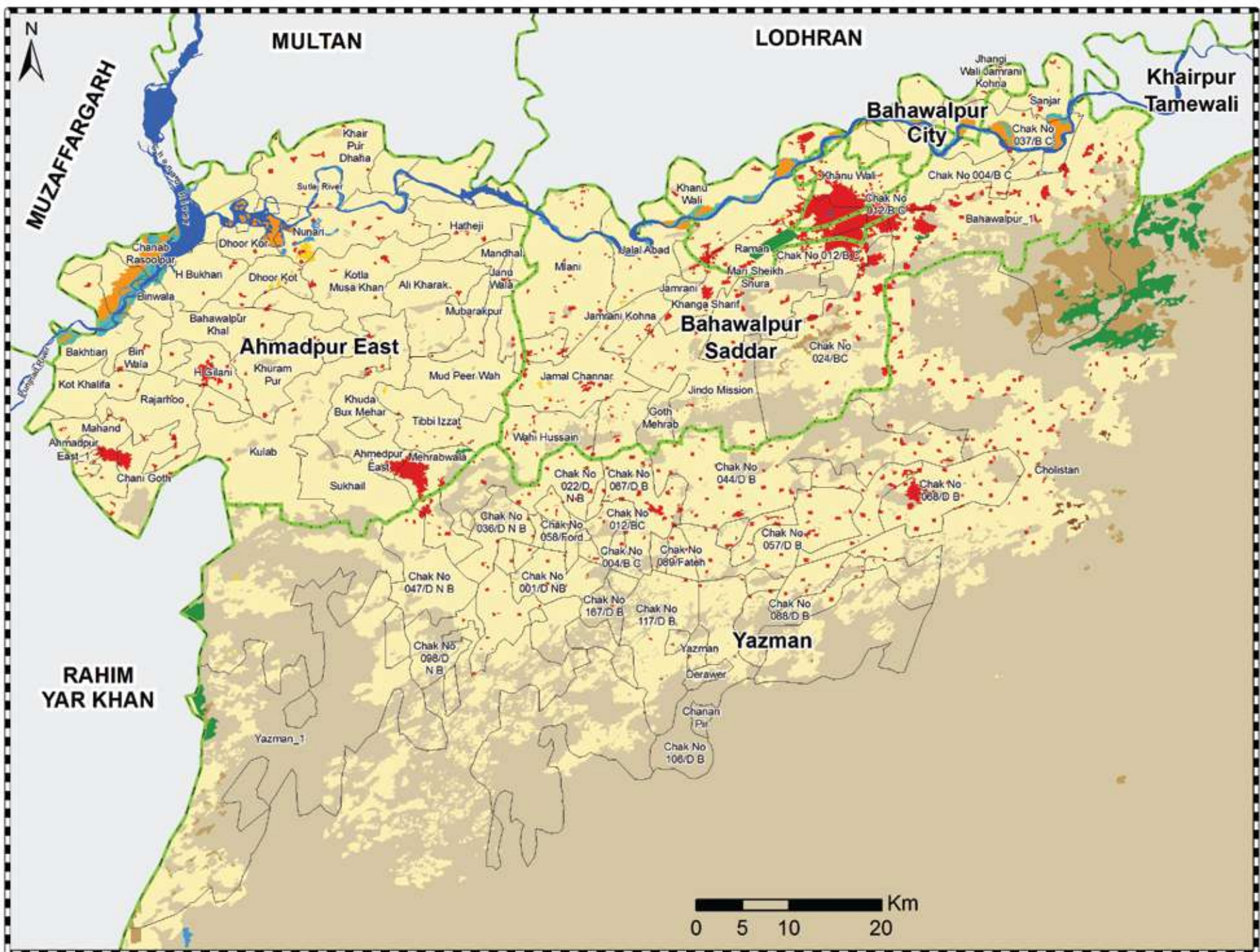
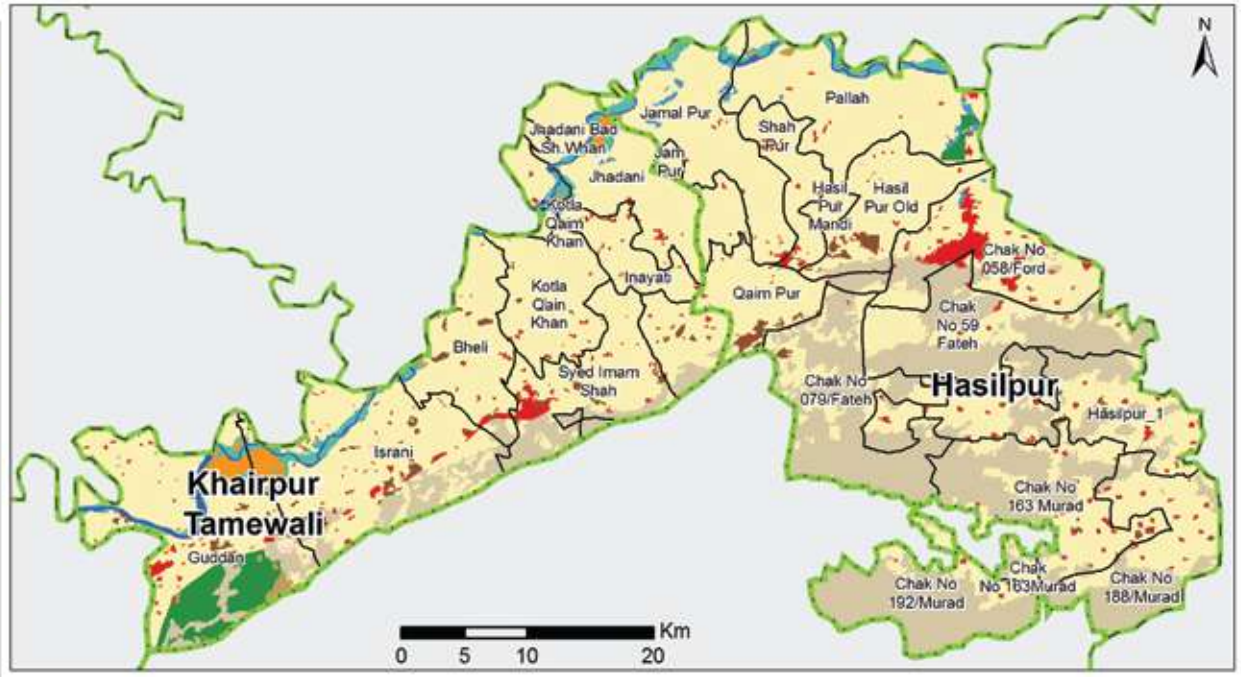
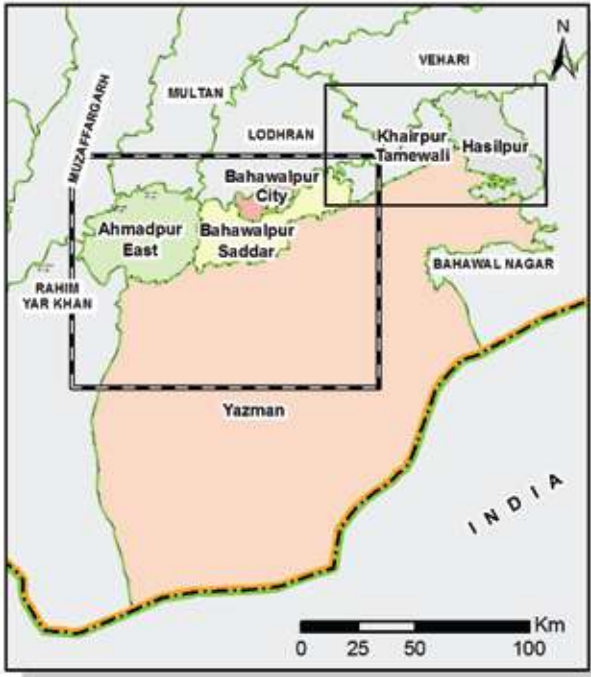
Tehsil Hasilpur



Tehsil Khairpur Tamewali



LAND USE & LAND COVER MAP



| Legend | |
|--------|---|
| | Bare Areas |
| | Bare Areas with Sparse Natural Vegetation |
| | Built-up |
| | Crop in Flood Plain |
| | Crop Marginal and Irrigated Saline |
| | Crop Rainfed |
| | Crop Irrigated |
| | Forest - Natural Trees and Mangroves |
| | Natural Vegetation in Wet Areas |
| | Orchards |
| | Range Lands - Natural Shrubs and Herbs |
| | Snow and Glaciers |
| | Wet Areas |
| | River and Water Body |
| | Union Council Boundary |
| | Tehsil Boundary |
| | District Boundary |
| | Provincial Boundary |
| | Line of Control |
| | International Boundary |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
 PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Landcover-SUPARCO

Datum: WGS 1984
Units: Degree

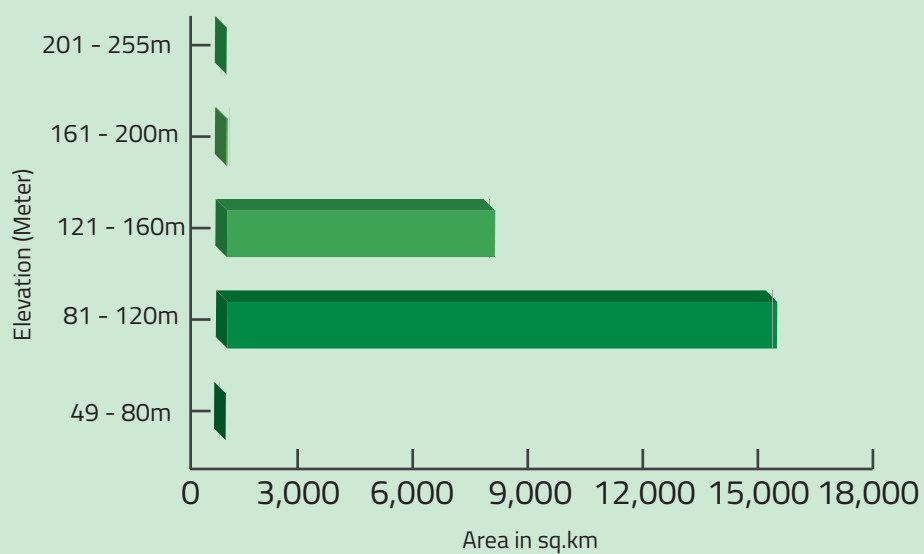
Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-002
Prepared by: Project Management Unit, NDMA
Last Updated: 22th June, 2017



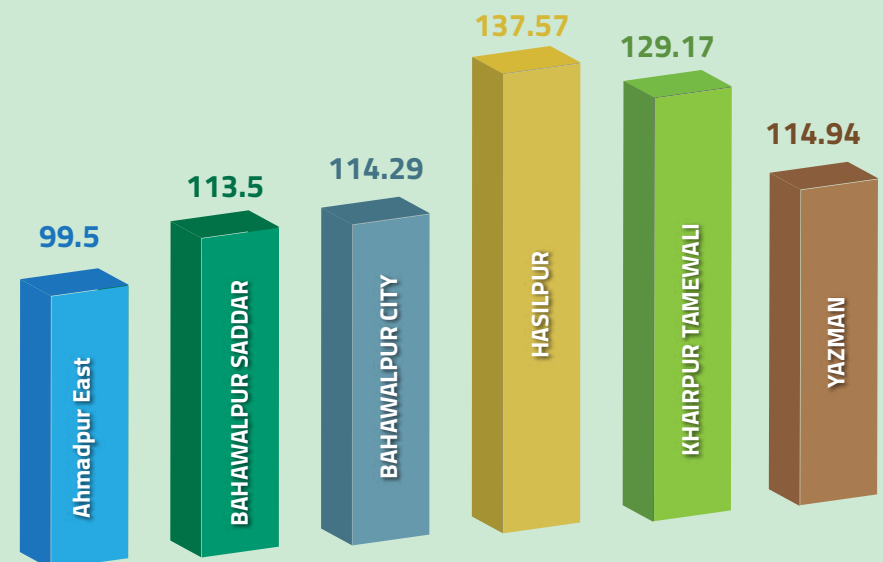
Elevation is the measurement of height of the land with respect to sea level or the sea floor. Elevation maps are used to identify how flat, elevated or hilly an area is, as well as to analyze other features of land using contour lines and symbols.

The elevation of the district is between 146m (High) to 57m (Low). It can be analyzed from the map that around 15768 Km² (66%) of the district lies within elevation range of 121-160m.

Elevation Distribution of District Bahawalpur

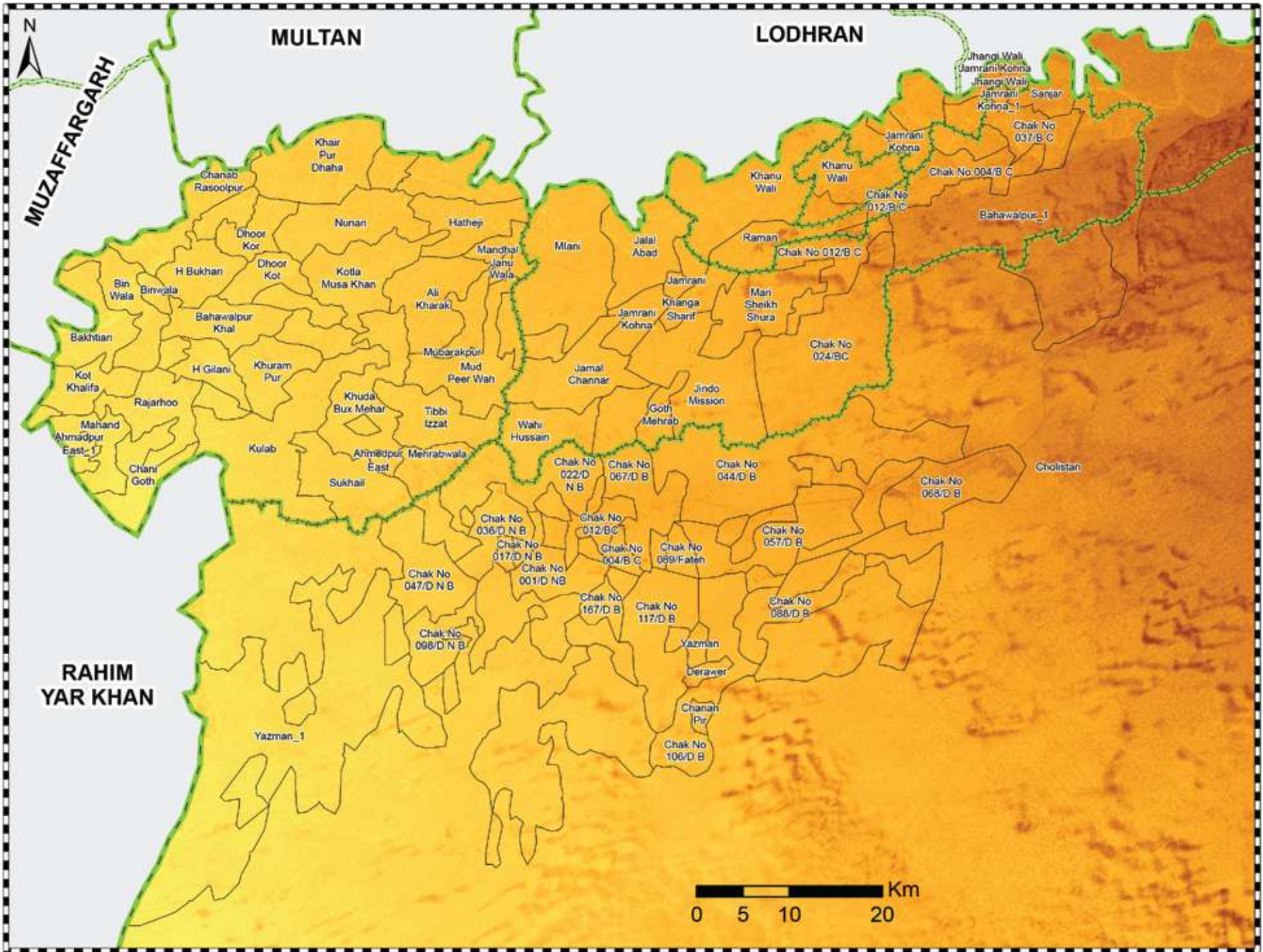
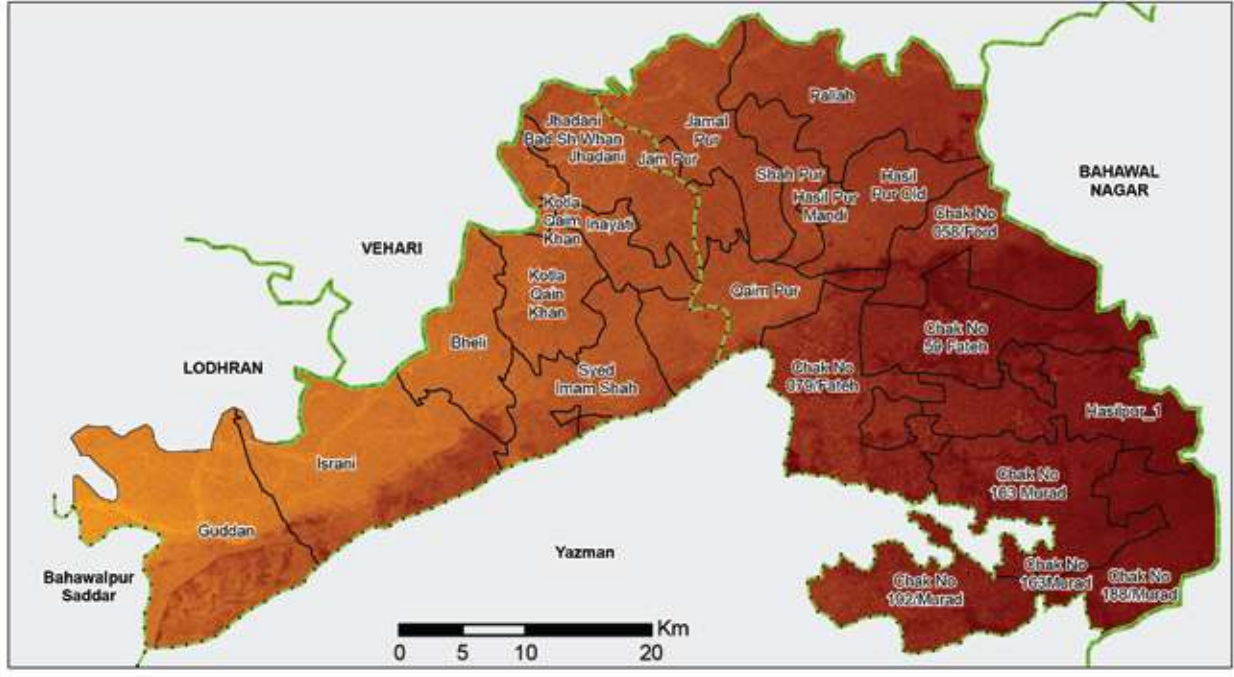
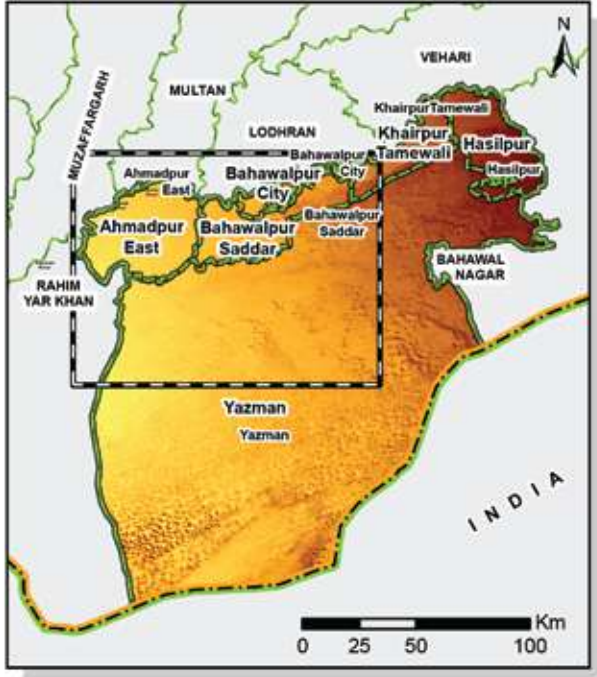


Tehsil Wise Mean Height (Meter)



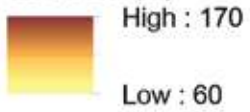
| Elevation Bands | Tehsil Wise Area Coverage (sq.km) | | | | | | District Total (sq.km) |
|-----------------|-----------------------------------|-------------------|-----------------|----------|-------------------|----------|------------------------|
| | Ahmadpur East | Bahawalpur Saddar | Bahawalpur City | Hasilpur | Khairpur Tamewali | Yazman | |
| 49 - 80 | 0.123 | 0 | 0 | 0 | 0 | 3.63 | 3.75 |
| 81 - 120 | 1480.80 | 228.13 | 987.94 | 1.31 | 23.84 | 13045.95 | 15768.01 |
| 121 - 160 | 1.34 | 17.84 | 194.38 | 1102.34 | 700.96 | 6129.03 | 8145.93 |
| 161 - 200 | 0 | 0 | 0.08 | 18.42 | 0.05 | 14.16 | 32.72 |
| 201 - 255 | 0 | 0 | 0 | 0.50 | 0 | 0.13 | 0.64 |

ELEVATION MAP



Legend

Elevation (m)



- Provincial Boundary
- Line of Control
- International Boundary

- Union Council Boundary
- Tehsil Boundary
- District Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan



MAP INFORMATION

Data Source(s):
 NASA (SRTM 30m DEM)
 Survey of Pakistan
 Pakistan Bureau of Statistics

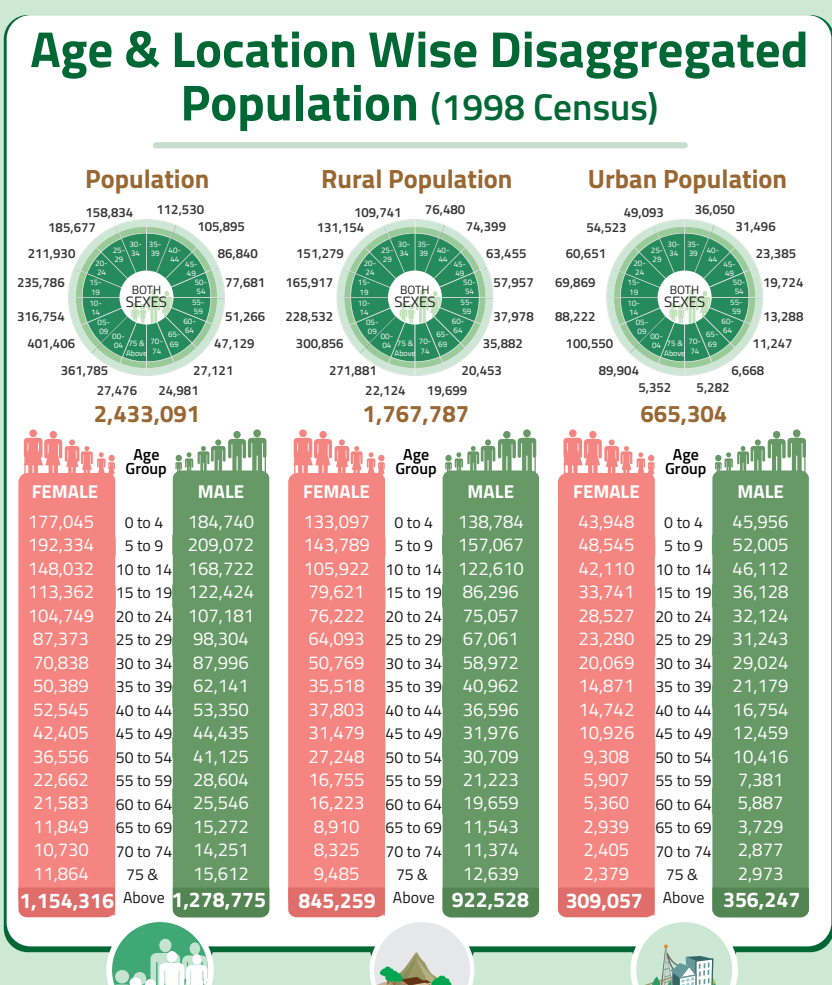
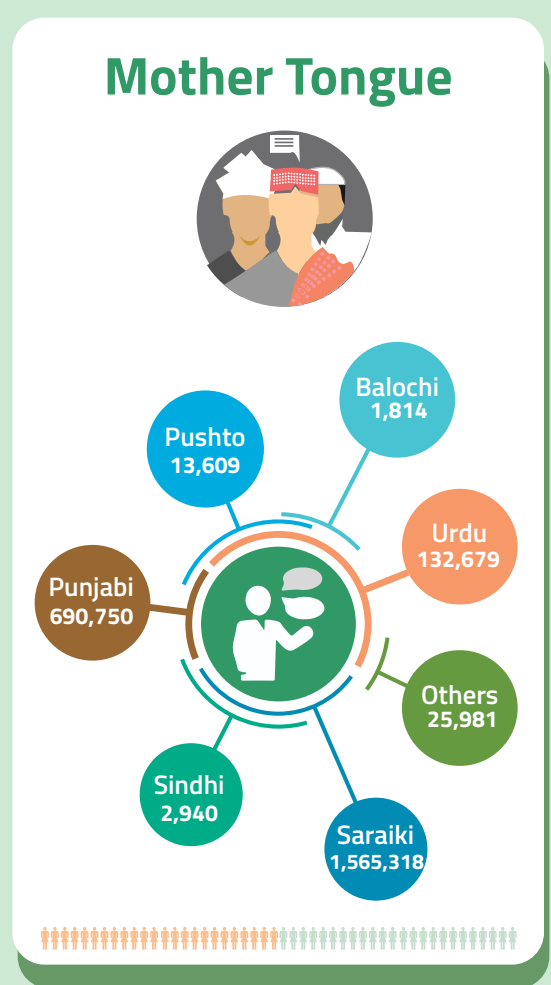
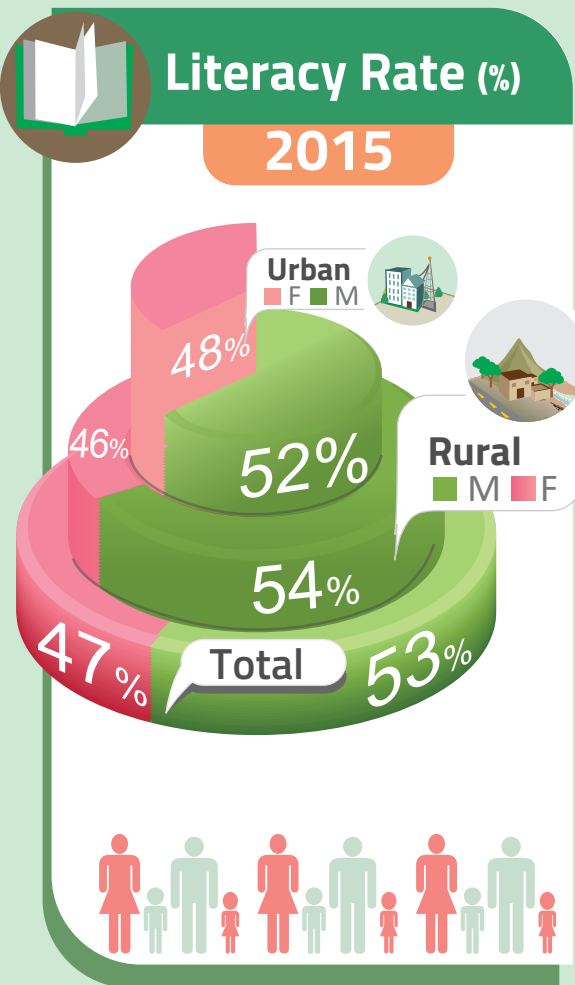
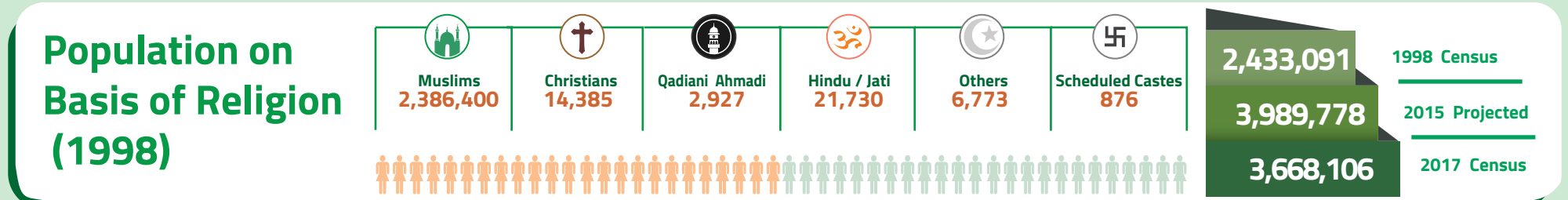
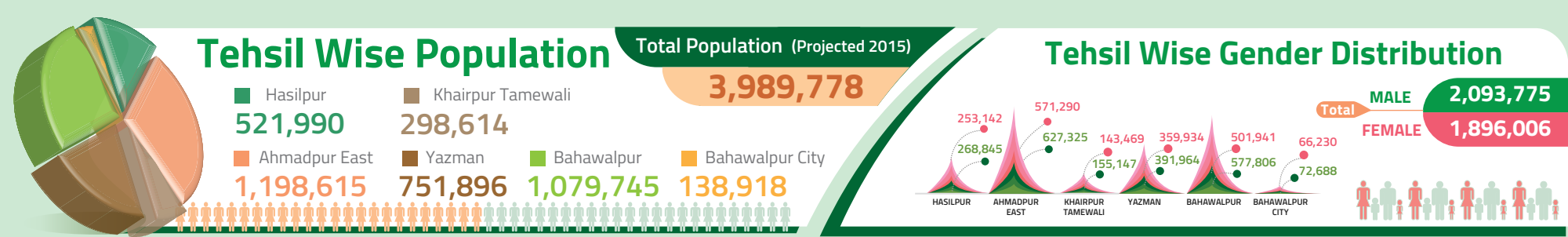
Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-003
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

5 POPULATION DISTRIBUTION

The district's population, according to 1998 census was 2,433,091 with gender segregation of 1,278,775 Male and 1,154,316 Female. The projected population statistics in 2015 are 3,989,778 heads. According to

1998 census, annual growth rate is 3.08% with average household size of 6.8 heads. 6 of the total housing units were 354356 in 1998.



Tehsil Ahmadpur East

| Union Councils | Population |
|--------------------|------------|
| Ahmadpur East_1 | 3,634 |
| Ahmedpur East | 6,021 |
| Ali Kharak | 20,385 |
| Bahawalpur Khalwan | 47,399 |
| Bakhtiyari | 18,498 |
| Bin Wala | 20,880 |
| Binwala | 3,760 |
| Chanab Rasoolpur | 21,620 |
| Chani Goth | 19,738 |
| Dhoor Kor | 8,908 |
| Dhoor Kot | 12,224 |
| H Bukhari | 17,291 |
| H Gilani | 7,345 |
| Hatheji | 22,173 |
| Janu Wala | 8,623 |
| Khair Pur Dhaha | 18,046 |
| Khuda Bux Mehar | 113,189 |
| Khuram Pur | 16,119 |
| Kot Khalifa | 19,854 |

Tehsil Bahawalpur

| Union Councils | Population |
|-------------------|------------|
| Kotla Musa Khan | 20,902 |
| Kulab | 22,062 |
| Mahand | 15,661 |
| Mandhal | 23,168 |
| Mehrabwala | 12,055 |
| Mubarakpur | 21,359 |
| Mud Peer Wah | 28,431 |
| Nunari | 21,082 |
| Rajarhoo | 17,242 |
| Sukhail | 16,074 |
| Tibbi Izzat | 23,582 |
| Bahawalpur_1 | 910 |
| Chak No 004/b C_1 | 18,457 |
| Chak No 012/b C_1 | 13,228 |

Tehsil Bahawalpur

| Union Councils | Population |
|---------------------|------------|
| Chak No 024/bc | 17,812 |
| Chak No 037/b C | 25,169 |
| Goth Mehrab | 2,326 |
| Jalal Abad | 14,563 |
| Jamal Channar | 20,507 |
| Jamrani | 1,789 |
| Jamrani Kohna_1 | 16,421 |
| Jhangi Wali Jamrani | 302 |
| Kohna_1 | 20,531 |
| Jindo Mission | 22,617 |
| Khanga Sharif | 17,639 |
| Khanu Wali_1 | 328,787 |
| Mari Sheikh Shijra | 15,530 |
| Miani | 20,101 |
| Raman_1 | 8,208 |
| Sanjar | 17,914 |
| Wahi Hussain | 15,526 |

Tehsil Hasilpur

| Union Councils | Population |
|-------------------|------------|
| Hasilpur_1 | 0 |
| Chak No 058/ford | 14,798 |
| Chak No 079/fateh | 18,028 |
| Chak No 163 Murad | 18,497 |
| Chak No 163murad | 2,897 |
| Chak No 188/murad | 20,959 |
| Chak No 192/murad | 15,179 |
| Chak No 59 Fateh | 17,260 |
| Hasil Pur Mandi | 4,483 |
| Hasil Pur Old | 82,951 |
| Jam Pur | 3,573 |
| Jamal Pur | 18,360 |
| Pallah | 20,137 |
| Qaim Pur | 19,455 |
| Shah Pur | 12,268 |

Tehsil Khairpur Tamewali

Union Councils

| | | |
|--------|----------------------|--------|
| 37,210 | BHELI | 40,455 |
| 15,004 | GUDDAN | 16,397 |
| 22,104 | ISRANI | 24,136 |
| 23,034 | JHADANI | 24,549 |
| 268 | JHADANI BAD SH.WHAN) | 278 |
| 1,816 | KOTLA QAIM KHAN | 2,026 |
| 15,896 | KOTLA QAIM KHAN | 16,852 |
| 16,419 | SYED IMAM SHAH | 17,552 |
| 11,718 | INAYATI | 12,902 |



Tehsil Bahawalpur City

Union Councils

| | | |
|--------|---------------------|--------|
| 2,758 | CHAK NO 012/B C | 3,175 |
| 11,258 | JAMRANI KOHNA | 12,120 |
| 1,406 | JHANGI WALI JAMRANI | 1,556 |
| 44,377 | KHANU WALI | 49,074 |
| 6,431 | RAMAN | 6,763 |



Tehsil Yazman

Union Councils

| | | |
|--------|--------------------|--------|
| 84,505 | YAZMAN_1 | 93,209 |
| 12,870 | CHAK NO 001/D N B | 13,993 |
| 2,978 | CHAK NO 004/B C | 3,267 |
| 2,480 | CHAK NO 017/D N B | 2,659 |
| 21,410 | CHAK NO 022/D N B | 22,809 |
| 2,574 | CHAK NO 024/BC_1 | 2,694 |
| 15,949 | CHAK NO 036/D N B | 17,710 |
| 3,126 | CHAK NO 037/B C_1 | 3,427 |
| 21,013 | CHAK NO 044/D B | 22,786 |
| 24,630 | CHAK NO 047/D N B | 26,567 |
| 16,196 | CHAK NO 057/D B | 17,400 |
| 4,575 | CHAK NO 058/FORD_1 | 4,841 |
| 14,707 | CHAK NO 067/D B | 16,449 |



Tehsil Yazman

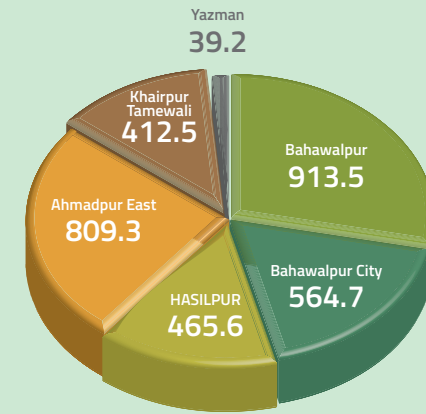
Union Councils

| | | |
|--------|-------------------|--------|
| 18,577 | CHAK NO 068/D B | 20,412 |
| 12,988 | CHAK NO 088/D B | 14,305 |
| 3,514 | CHAK NO 089/FATEH | 3,527 |
| 19,570 | CHAK NO 098/D N B | 21,179 |
| 18,530 | CHAK NO 106/D B | 20,033 |
| 19,672 | CHAK NO 117/D B | 21,471 |
| 4,065 | CHAK NO 167/D B | 4,629 |
| 904 | CHANAN PIR | 987 |
| 24,960 | CHOLISTAN | 27,231 |
| 2,161 | DERAWER | 2,186 |
| 1,531 | YAZMAN | 1,553 |
| 6,449 | CHAK NO 012/BC_2 | 6,640 |



Tehsil Wise Population Density
(Persons/sq.km)

The average population density of Bahawalpur district was nearly 98 persons per sq.km as per 1998 census which in 2017 has grown to 153.4 persons per sq.km. The most densely populated Tehsil of the district is Bahawalpur with population Density of 913.5 persons/ sq.km, where as Yazman is the sparsely populated.



Tehsil Ahmadpur East

| Union Councils | Population | Male | Female | Area (sq km) | Density (Person / sq.km) |
|----------------------|------------------|----------------|----------------|--------------|--------------------------|
| AHMADPUR EAST_1 | 6,872 | 3,634 | 3,238 | 5 | 1,374 |
| AHMEDPUR EAST | 11,313 | 6,021 | 5,292 | 6 | 1,886 |
| ALI KHARAK | 38,976 | 20,385 | 18,591 | 62 | 629 |
| BAHAWALPUR KHALWAN | 90,965 | 47,399 | 43,566 | 88 | 1,034 |
| BAKHTIARI | 35,574 | 18,498 | 17,076 | 54 | 659 |
| BIN WALA | 40,047 | 20,880 | 19,167 | 70 | 572 |
| BINWALA | 6,991 | 3,760 | 3,231 | 8 | 874 |
| CHANAB RASOOLPUR | 41,492 | 21,620 | 19,872 | 49 | 847 |
| CHANI GOTH | 38,074 | 19,738 | 18,336 | 51 | 747 |
| DHOOR KOR | 17,050 | 8,908 | 8,142 | 29 | 588 |
| DHOOR KOT | 23,118 | 12,224 | 10,895 | 45 | 514 |
| H BUKHARI | 32,763 | 17,291 | 15,472 | 39 | 840 |
| H GILANI | 14,113 | 7,345 | 6,767 | 42 | 336 |
| HATHEJI | 42,631 | 22,173 | 20,458 | 47 | 907 |
| JANU WALA | 16,376 | 8,623 | 7,752 | 4 | 4,094 |
| KHAIR PUR DHAHA | 34,382 | 18,046 | 16,336 | 84 | 409 |
| KHUDA BUX MEHAR | 215,201 | 113,189 | 102,012 | 70 | 3,074 |
| KHURAM PUR | 30,869 | 16,119 | 14,750 | 71 | 435 |
| KOT KHALIFA | 38,377 | 19,854 | 18,523 | 42 | 914 |
| KOTLA MUSA KHAN | 39,638 | 20,902 | 18,736 | 67 | 592 |
| KULAB | 41,813 | 22,062 | 19,751 | 128 | 327 |
| MAHAND | 29,773 | 15,661 | 14,113 | 34 | 876 |
| MANDHAL | 44,257 | 23,168 | 21,089 | 18 | 2,459 |
| MEHRABWALA | 22,774 | 12,055 | 10,719 | 28 | 813 |
| MUBARAKPUR | 41,017 | 21,359 | 19,659 | 36 | 1,139 |
| MUD PEER WAH | 54,986 | 28,431 | 26,555 | 62 | 887 |
| NUNARI | 40,636 | 21,082 | 19,554 | 68 | 598 |
| RAJARHOO | 33,189 | 17,242 | 15,947 | 52 | 638 |
| SUKHAIL | 30,502 | 16,074 | 14,427 | 68 | 449 |
| TIBBI IZZAT | 44,846 | 23,582 | 21,264 | 54 | 830 |
| Tehsil Total: | 1,198,615 | 627,325 | 571,290 | 1,481 | 30,341 |

Tehsil Bahawalpur

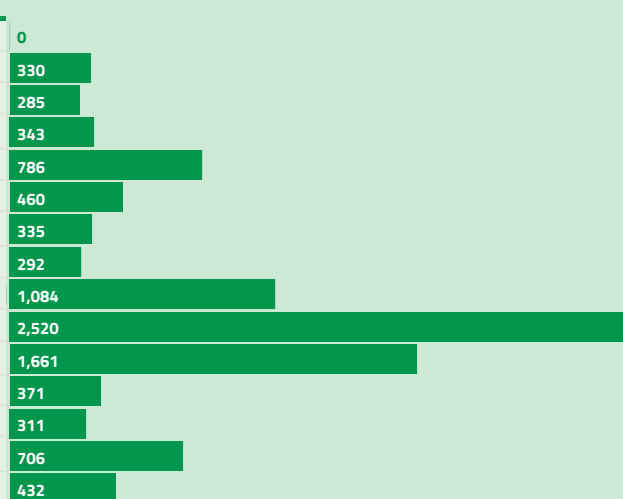
| | | | | | |
|-----------------------------|------------------|----------------|----------------|--------------|---------------|
| BAHAWALPUR_1 | 1,735 | 910 | 826 | 204 | 9 |
| CHAK NO 004/B C_1 | 35,067 | 18,457 | 16,610 | 44 | 797 |
| CHAK NO 012/B C_1 | 24,909 | 13,228 | 11,681 | 46 | 542 |
| CHAK NO 024/BC | 33,499 | 17,812 | 15,687 | 153 | 219 |
| CHAK NO 037/B C | 48,520 | 25,169 | 23,351 | 67 | 724 |
| GOth MEHRAB | 4,541 | 2,326 | 2,215 | 18 | 252 |
| JALAL ABAD | 27,659 | 14,563 | 13,097 | 61 | 453 |
| JAMAL CHANNAR | 39,029 | 20,507 | 18,522 | 68 | 574 |
| JAMRANI | 3,484 | 1,789 | 1,696 | 6 | 581 |
| JAMRANI KOHNA_1 | 31,326 | 16,421 | 14,905 | 45 | 696 |
| JHANGI WALI JAMRANI KOHNA_1 | 567 | 302 | 265 | 4 | 142 |
| JINDO MISSION | 43,148 | 22,617 | 20,531 | 108 | 400 |
| KHANGA SHARIF | 33,878 | 17,639 | 16,239 | 20 | 1,694 |
| KHANU WALI_1 | 604,222 | 328,787 | 275,435 | 45 | 13,427 |
| MARI SHEIKH SHIJRA | 29,737 | 15,530 | 14,206 | 64 | 465 |
| MIANI | 38,432 | 20,101 | 18,331 | 124 | 310 |
| RAMAN_1 | 15,408 | 8,208 | 7,199 | 12 | 1,284 |
| SANJAR | 34,614 | 17,914 | 16,701 | 43 | 805 |
| WAHI HUSSAIN | 29,970 | 15,526 | 14,444 | 50 | 599 |
| Tehsil Total: | 1,079,745 | 577,806 | 501,941 | 1,182 | 23,973 |

Tehsil Bahawalpur City

| | | | | | |
|---------------------------|----------------|---------------|---------------|------------|--------------|
| CHAK NO 012/B C | 5,933 | 3,175 | 2,758 | 12 | 494 |
| JAMRANI KOHNA | 23,378 | 12,120 | 11,258 | 39 | 599 |
| JHANGI WALI JAMRANI KOHNA | 2,962 | 1,556 | 1,406 | 9 | 329 |
| KHANU WALI | 93,451 | 49,074 | 44,377 | 146 | 640 |
| RAMAN | 13,194 | 6,763 | 6,431 | 40 | 330 |
| Tehsil Total: | 138,918 | 72,688 | 66,230 | 246 | 2,392 |

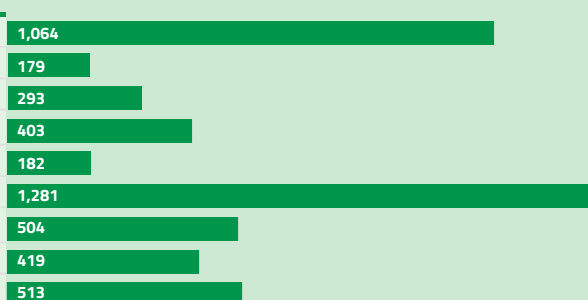
Tehsil Hasilpur

| | | | | | | |
|----------------------|----------------|----------------|----------------|--------------|--------------|-------|
| Hasilpur_1 | 0 | 0 | 0 | 100 | 0 | 0 |
| Chak No 058/ford | 29,037 | 14,798 | 14,239 | 88 | 330 | 330 |
| Chak No 079/fateh | 35,647 | 18,028 | 17,619 | 125 | 285 | 285 |
| Chak No 163 Murad | 36,036 | 18,497 | 17,539 | 105 | 343 | 343 |
| Chak No 163murad | 5,504 | 2,897 | 2,607 | 7 | 786 | 786 |
| Chak No 188/murad | 40,909 | 20,959 | 19,949 | 89 | 460 | 460 |
| Chak No 192/murad | 29,450 | 15,179 | 14,271 | 88 | 335 | 335 |
| Chak No 59 Fateh | 33,849 | 17,260 | 16,588 | 116 | 292 | 292 |
| Hasil Pur Mandi | 8,673 | 4,483 | 4,190 | 8 | 1,084 | 1,084 |
| Hasil Pur Old | 161,280 | 82,951 | 78,329 | 64 | 2,520 | 2,520 |
| Jam Pur | 6,645 | 3,573 | 3,071 | 4 | 1,661 | 1,661 |
| Jamal Pur | 35,262 | 18,360 | 16,902 | 95 | 371 | 371 |
| Pallah | 38,512 | 20,137 | 18,376 | 124 | 311 | 311 |
| Qaim Pur | 37,435 | 19,455 | 17,979 | 53 | 706 | 706 |
| Shah Pur | 23,751 | 12,268 | 11,483 | 55 | 432 | 432 |
| Tehsil Total: | 521,990 | 268,845 | 253,142 | 1,121 | 9,916 | |



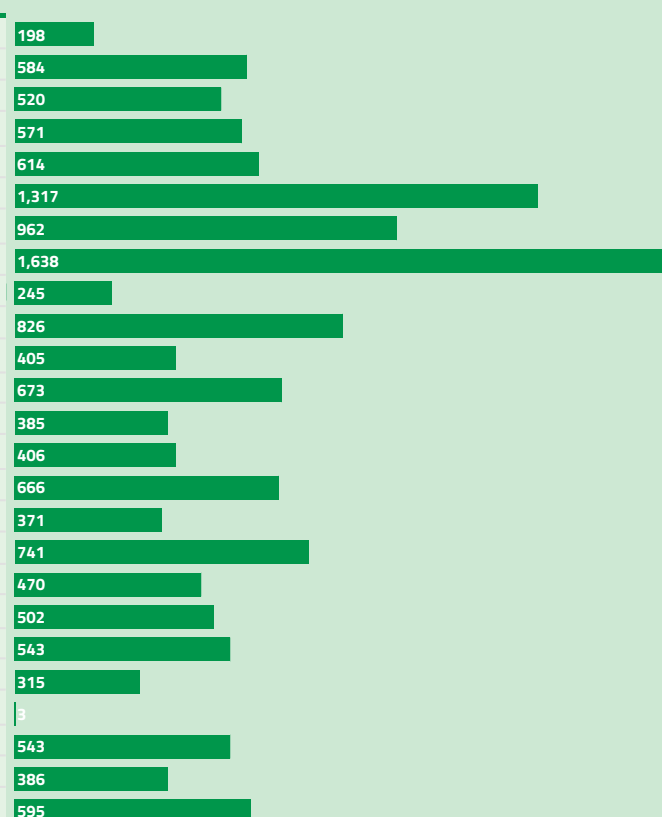
Tehsil Khairpur Tamewali

| | | | | | | |
|-----------------------|----------------|----------------|----------------|------------|--------------|-------|
| Bheli | 77,664 | 40,455 | 37,210 | 73 | 1,064 | 1,064 |
| Guddan | 31,401 | 16,397 | 15,004 | 175 | 179 | 179 |
| Israni | 46,240 | 24,136 | 22,104 | 158 | 293 | 293 |
| Jhadani | 47,583 | 24,549 | 23,034 | 118 | 403 | 403 |
| Jhadani Bad Sh.wahan) | 545 | 278 | 268 | 3 | 182 | 182 |
| Kotla Qaim Khan | 3,842 | 2,026 | 1,816 | 3 | 1,281 | 1,281 |
| Kotla Qain Khan | 32,749 | 16,852 | 15,896 | 65 | 504 | 504 |
| Syed Imam Shah | 33,971 | 17,552 | 16,419 | 81 | 419 | 419 |
| Inayati | 24,619 | 12,902 | 11,718 | 48 | 513 | 513 |
| Tehsil Total: | 298,614 | 155,147 | 143,469 | 724 | 4,838 | |



Tehsil Yazman

| | | | | | | |
|----------------------|----------------|----------------|----------------|---------------|---------------|-------|
| Yazman_1 | 177,713 | 93,209 | 84,505 | 898 | 198 | 198 |
| Chak No 001/d N B | 26,863 | 13,993 | 12,870 | 46 | 584 | 584 |
| Chak No 004/b C | 6,245 | 3,267 | 2,978 | 12 | 520 | 520 |
| Chak No 017/d N B | 5,139 | 2,659 | 2,480 | 9 | 571 | 571 |
| Chak No 022/d N B | 44,219 | 22,809 | 21,410 | 72 | 614 | 614 |
| Chak No 024/bc_1 | 5,268 | 2,694 | 2,574 | 4 | 1,317 | 1,317 |
| Chak No 036/d N B | 33,659 | 17,710 | 15,949 | 35 | 962 | 962 |
| Chak No 037/b C_1 | 6,553 | 3,427 | 3,126 | 4 | 1,638 | 1,638 |
| Chak No 044/d B | 43,799 | 22,786 | 21,013 | 179 | 245 | 245 |
| Chak No 047/d N B | 51,197 | 26,567 | 24,630 | 62 | 826 | 826 |
| Chak No 057/d B | 33,596 | 17,400 | 16,196 | 83 | 405 | 405 |
| Chak No 058/ford_1 | 9,416 | 4,841 | 4,575 | 14 | 673 | 673 |
| Chak No 067/d B | 31,156 | 16,449 | 14,707 | 81 | 385 | 385 |
| Chak No 068/d B | 38,989 | 20,412 | 18,577 | 96 | 406 | 406 |
| Chak No 088/d B | 27,293 | 14,305 | 12,988 | 41 | 666 | 666 |
| Chak No 089/fateh | 7,041 | 3,527 | 3,514 | 19 | 371 | 371 |
| Chak No 098/d N B | 40,748 | 21,179 | 19,570 | 55 | 741 | 741 |
| Chak No 106/d B | 38,563 | 20,033 | 18,530 | 82 | 470 | 470 |
| Chak No 117/d B | 41,144 | 21,471 | 19,672 | 82 | 502 | 502 |
| Chak No 167/d B | 8,694 | 4,629 | 4,065 | 16 | 543 | 543 |
| Chanan Pir | 1,891 | 987 | 904 | 6 | 315 | 315 |
| Cholistan | 52,190 | 27,231 | 24,960 | 17,260 | 3 | 3 |
| Derawer | 4,347 | 2,186 | 2,161 | 8 | 543 | 543 |
| Yazman | 3,084 | 1,553 | 1,531 | 8 | 386 | 386 |
| Chak No 012/bc_2 | 13,089 | 6,640 | 6,449 | 22 | 595 | 595 |
| Tehsil Total: | 751,896 | 391,964 | 359,934 | 19,194 | 14,479 | |

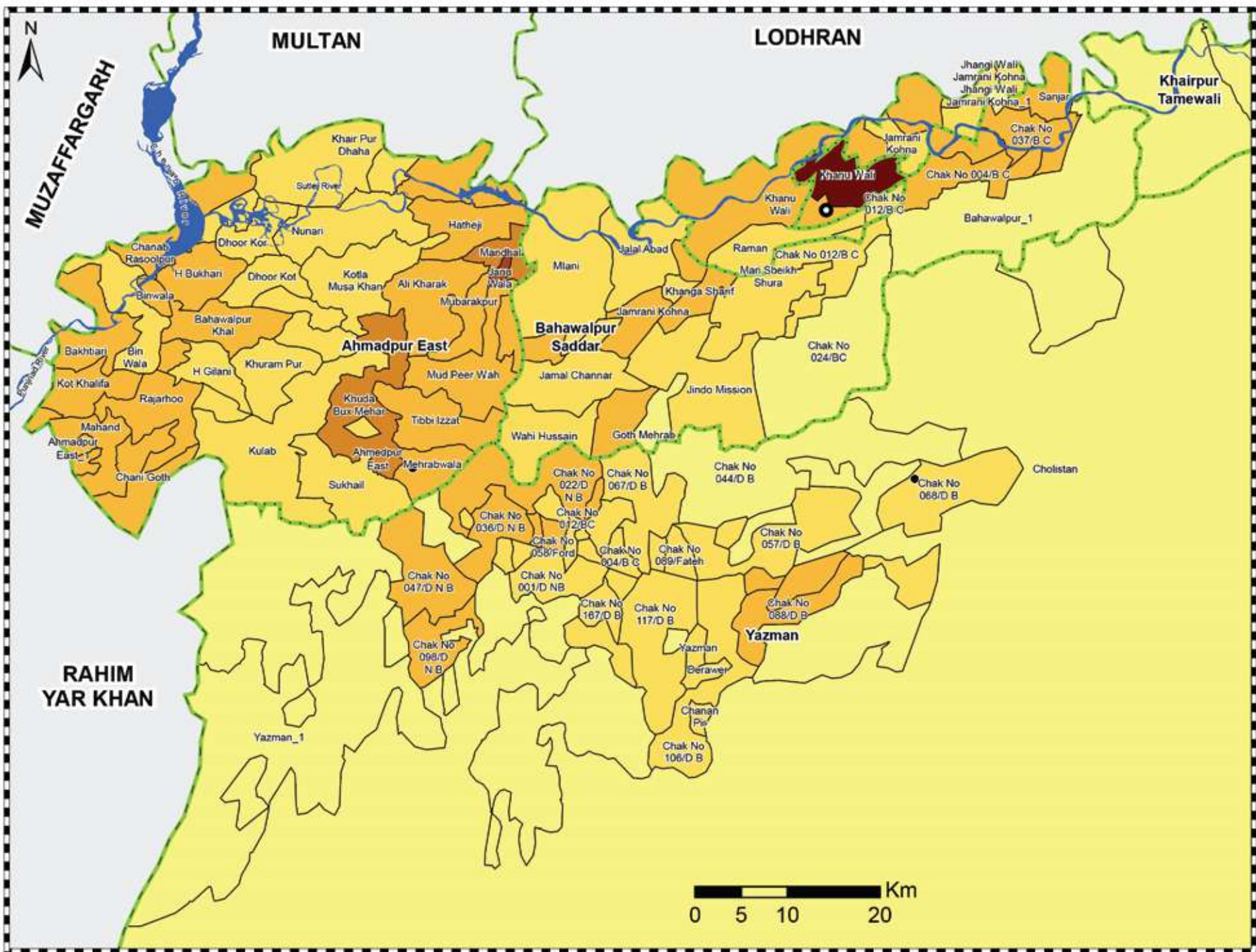
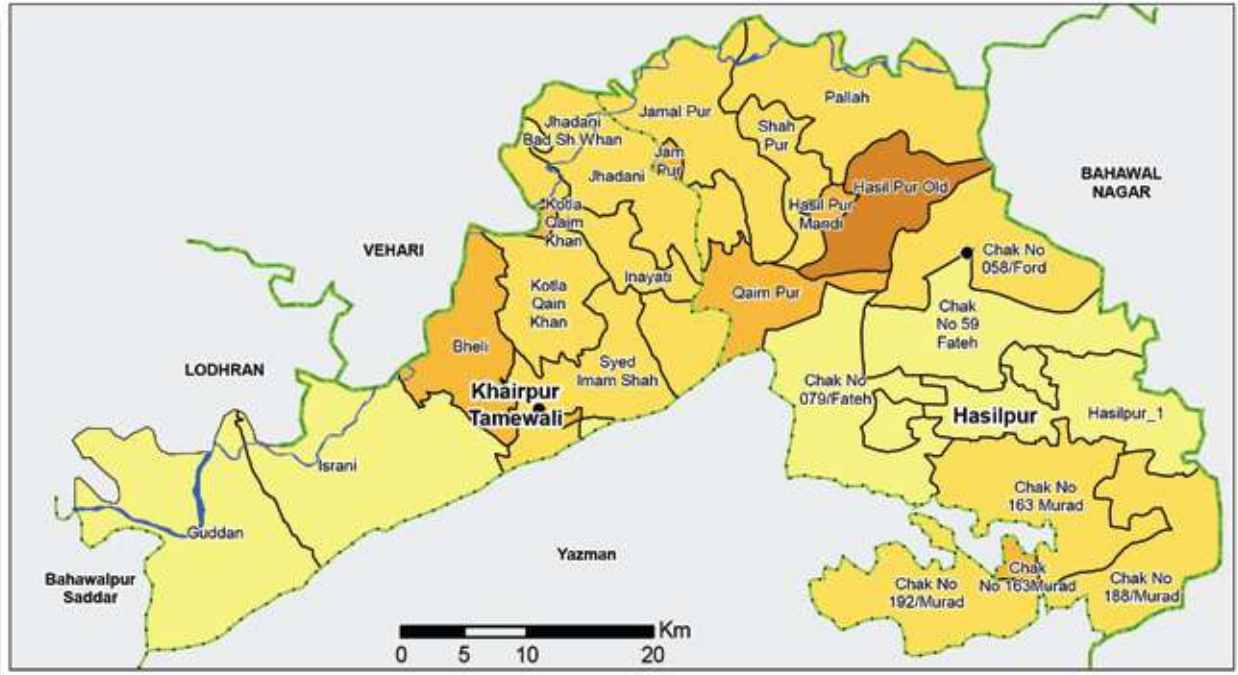
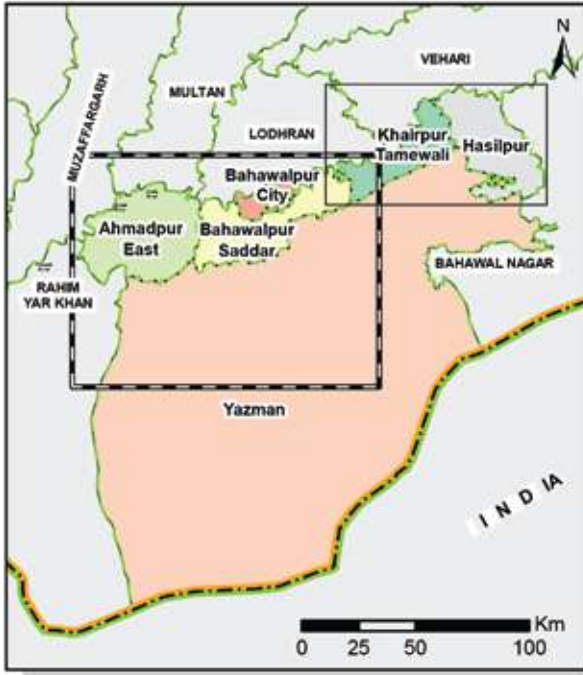


| | | | | | | |
|------------------------|------------------|------------------|------------------|---------------|------------|--|
| District Total: | 3,989,778 | 2,093,775 | 1,896,006 | 23,984 | 834 | |
|------------------------|------------------|------------------|------------------|---------------|------------|--|

Socio-Economics Statistics (2015)



POPULATION DENSITY (2015) MAP



Legend

- District Headquarter
- Tehsil Headquarter
- Population Density (Person/Sq. Km.)
 - Abc ≤ 300
 - Abc 301 - 600
 - Abc 601 - 1800
 - Abc 1801 - 3600
 - Abc 3601 - 7200
 - Abc > 7200
- River and Water Body
- Union Council Boundary
- Abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics, Survey of Pakistan

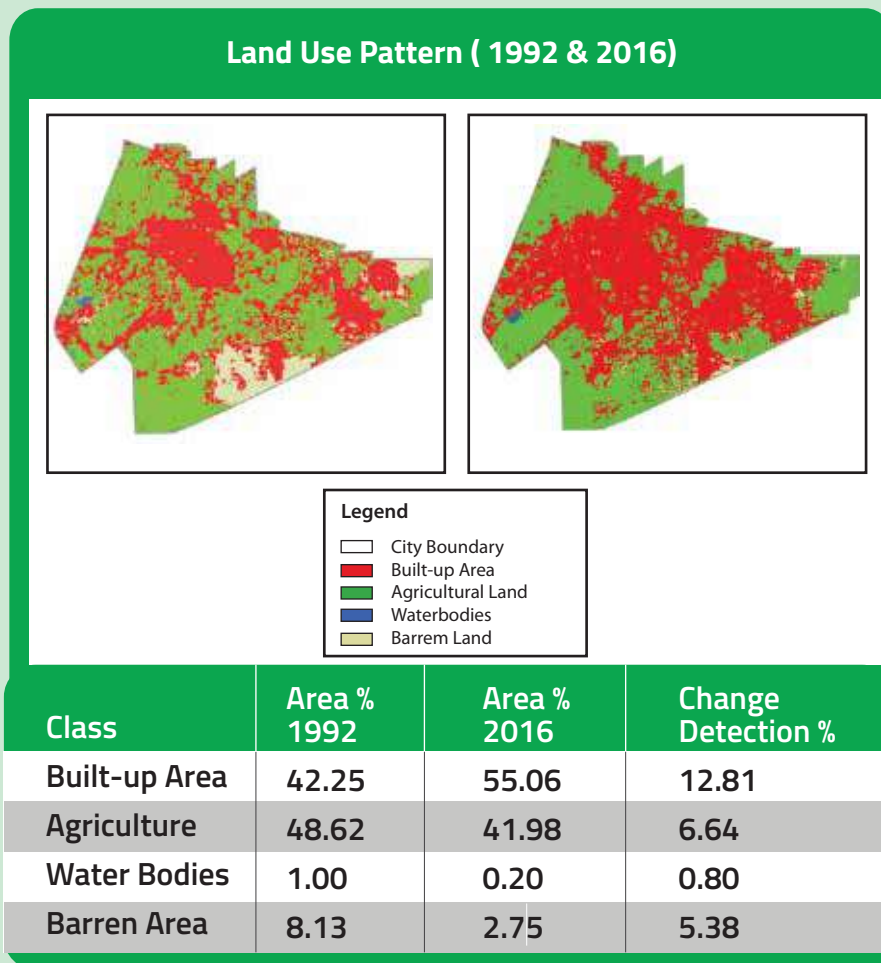
Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-006
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

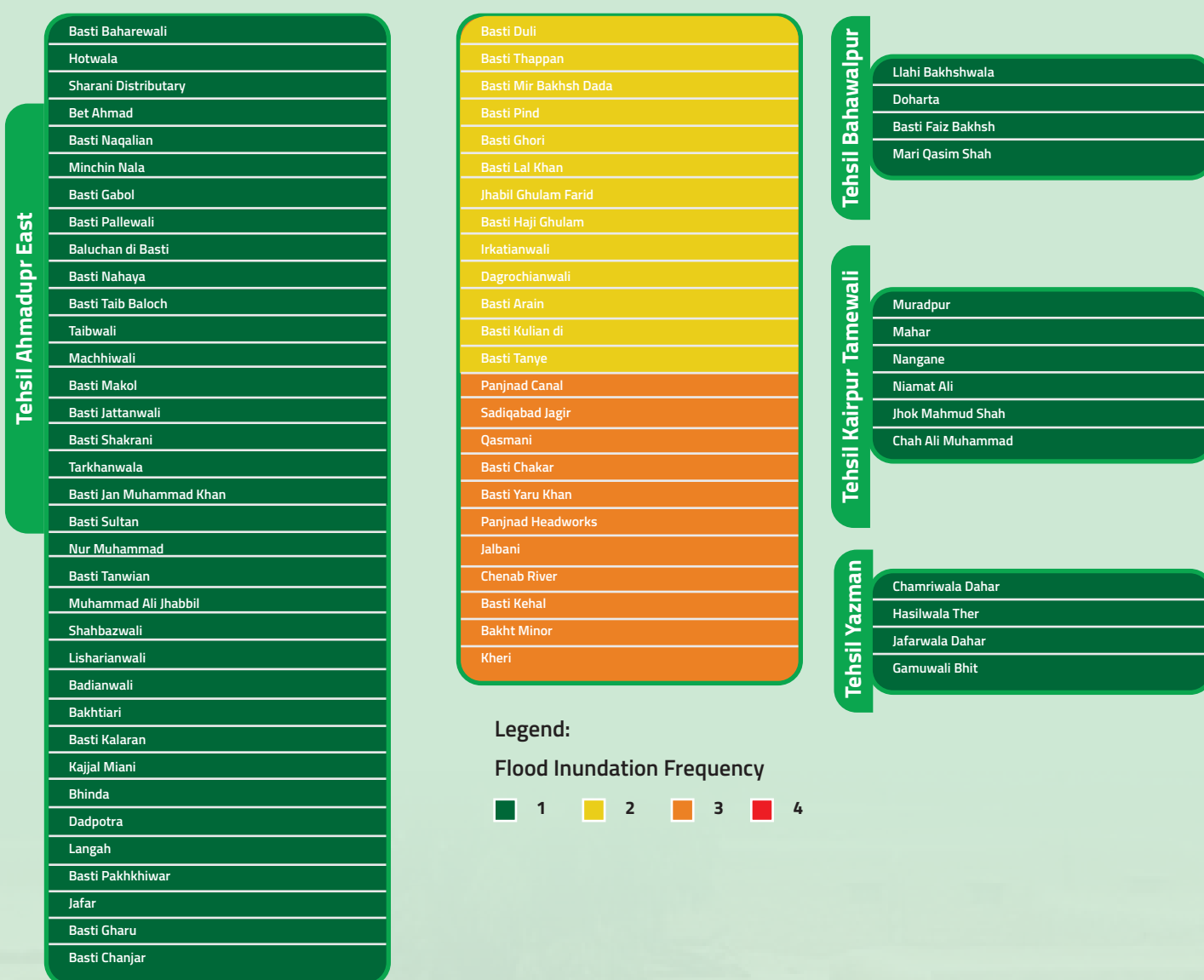
7 SETTLEMENTS

The settlements of the district include tehsils, union councils, cities and villages. We can broadly classify the settlement of Bahawalpur district into two categories i.e. Urban and the Rural Settlement. The geographic distribution of settlements over the district is manifested in the Settlement Map.

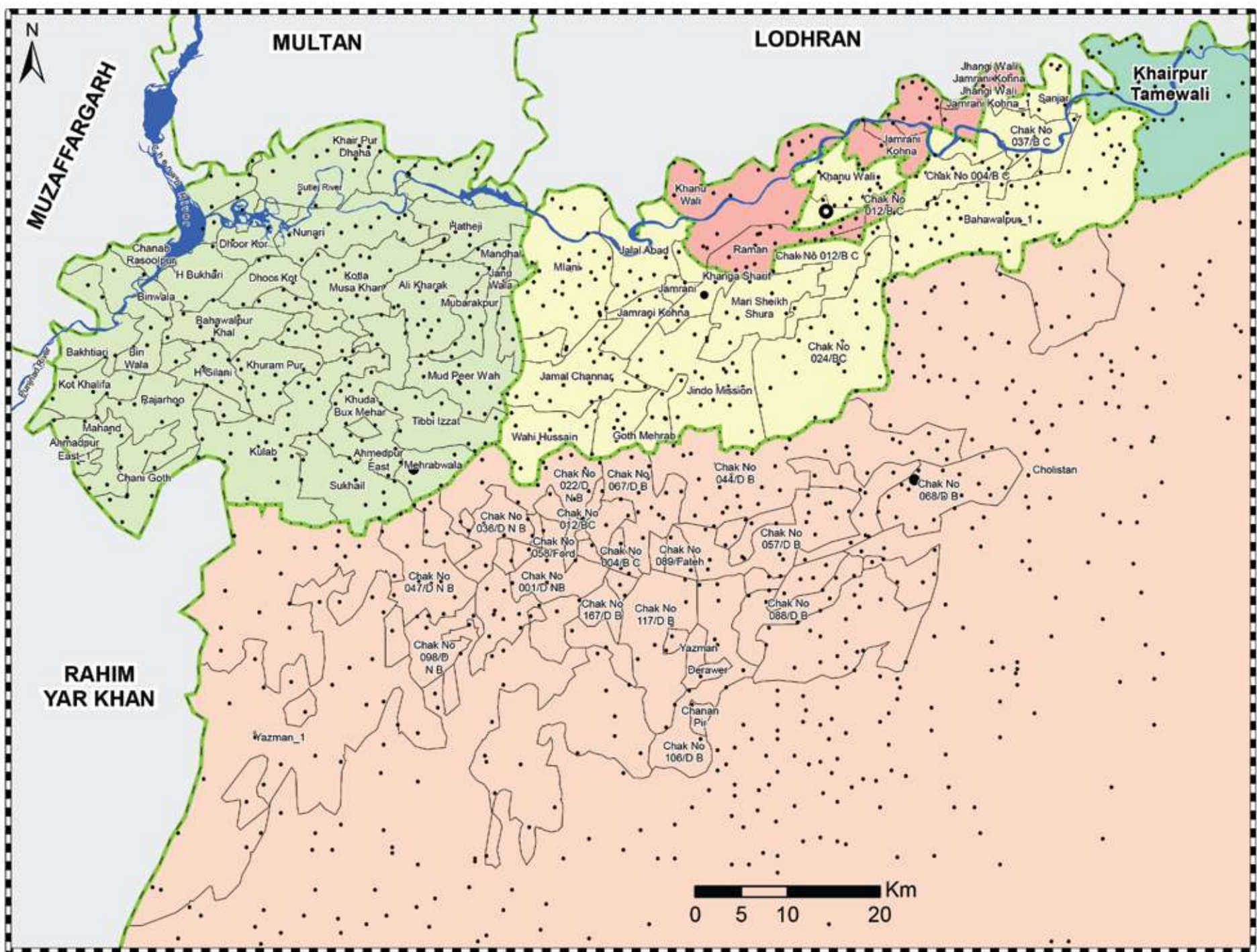
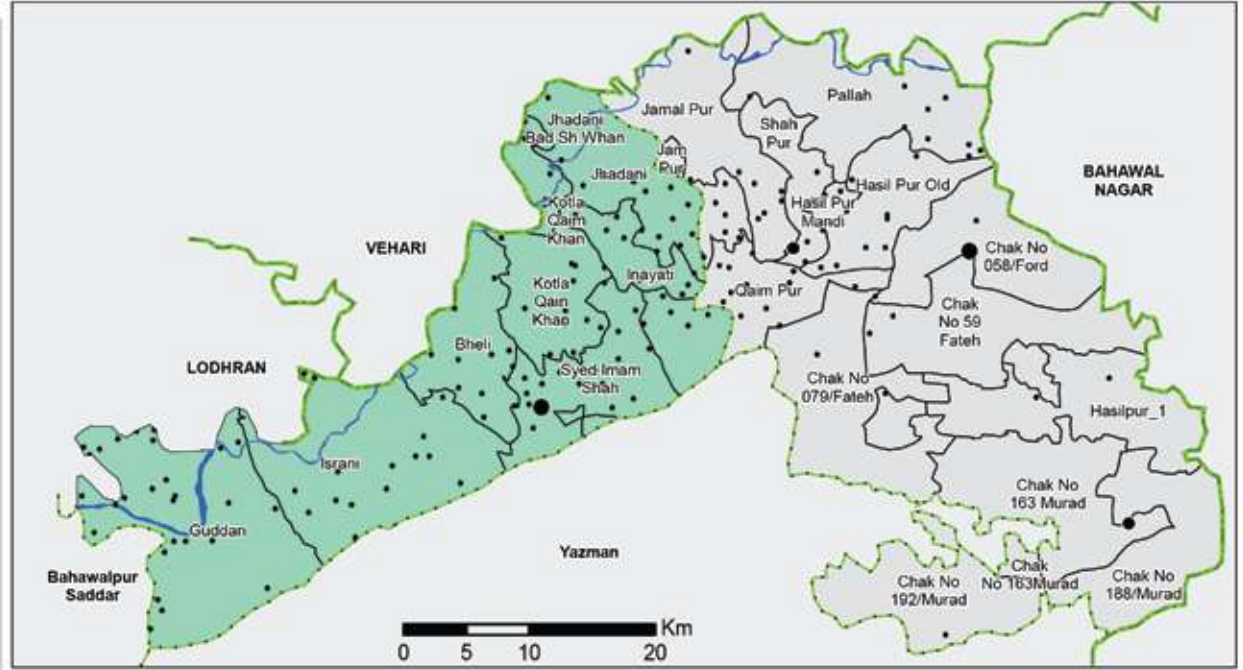
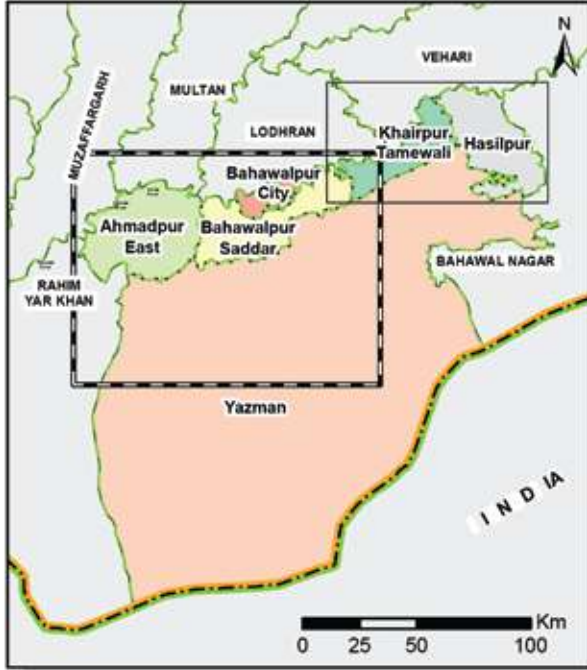
Urban Sprawl of Bahawalpur City in 1992 and 2016 is shown in the figures on the right. It shows that most part of the city is occupied by the Agricultural land use i.e. 48.62 %, followed by the built-up land i.e. 42.25 % and barren land about 08.13%. But due to increase in population of the city land use of the city has been changed as compared to the past as in 2013 the Built-up area of the city increases with the decrease in agricultural and barren land. The built-up land reaches up to 55.06% from 42.25% while there was a decrease of almost 07% in Agricultural land use and 06% in the barren land of the city. In Bahawalpur City most of the agricultural land is engulfed by the built-up land in the city in the span of 24 years



Settlements Vulnerable to Riverine Flood on Basis of Inundation Frequency (2010 to 2017)




SETTLEMENTS MAP



Legend

- District Headquarter
- Tehsil Headquarter
- Major Towns
- Villages
- River and Water Body
- Abc Union Council Boundary
- Tehsil Boundary**
- Ahmadpur East
- Bahawalpur City
- Bahawalpur Saddar
- Hasilpur
- Khairpur Tamewali
- Yazman
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan



MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics, Survey of Pakistan

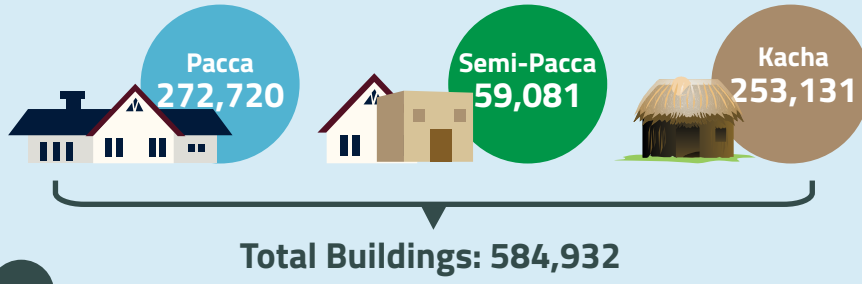
Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-007
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

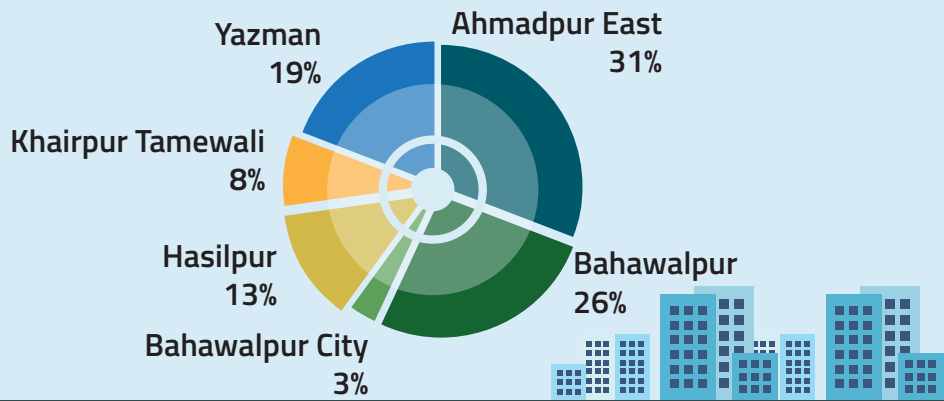
8 BUILDING DISTRIBUTION

The distribution of building over different parts of the district is shown in the Building Distribution Map. Based on nature of building material used, buildings can be categorized as:

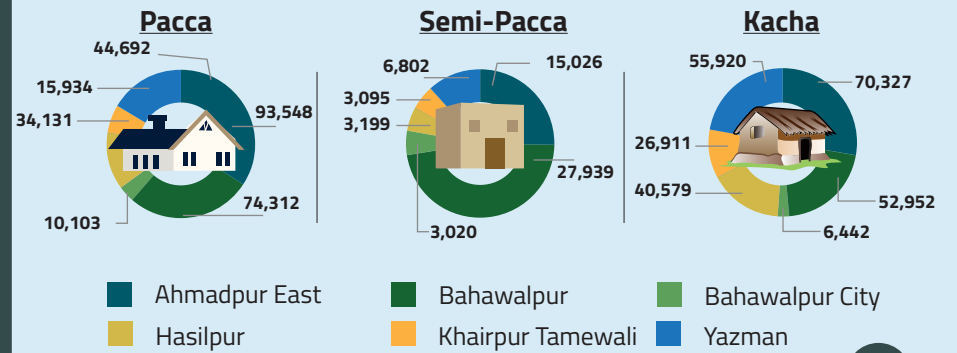
District Total



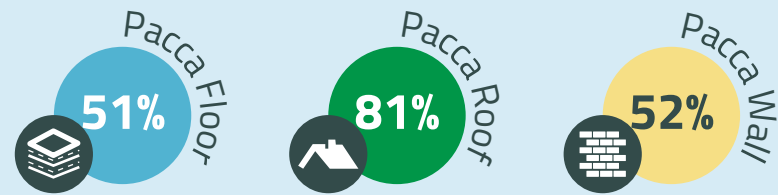
Tehsil Wise Building Distribution



Tehsil Wise Building Distribution by Type

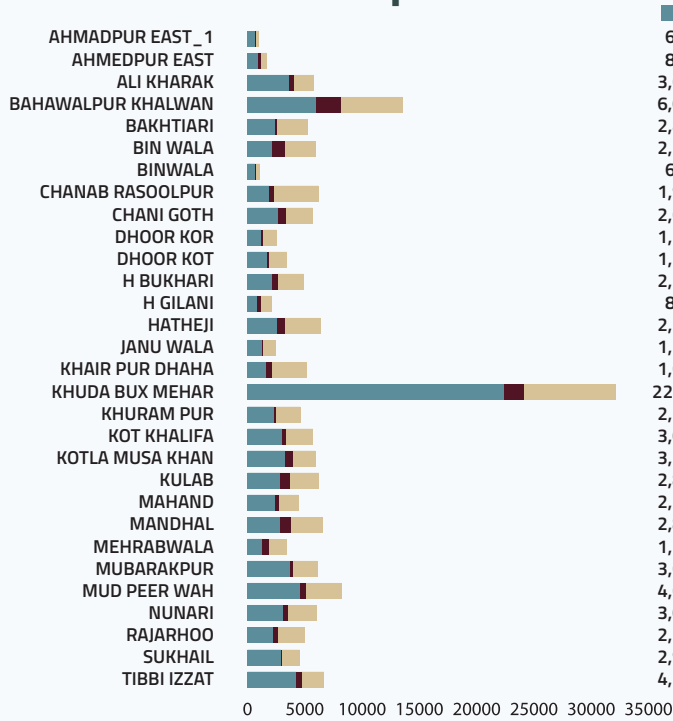


House Hold Characteristics

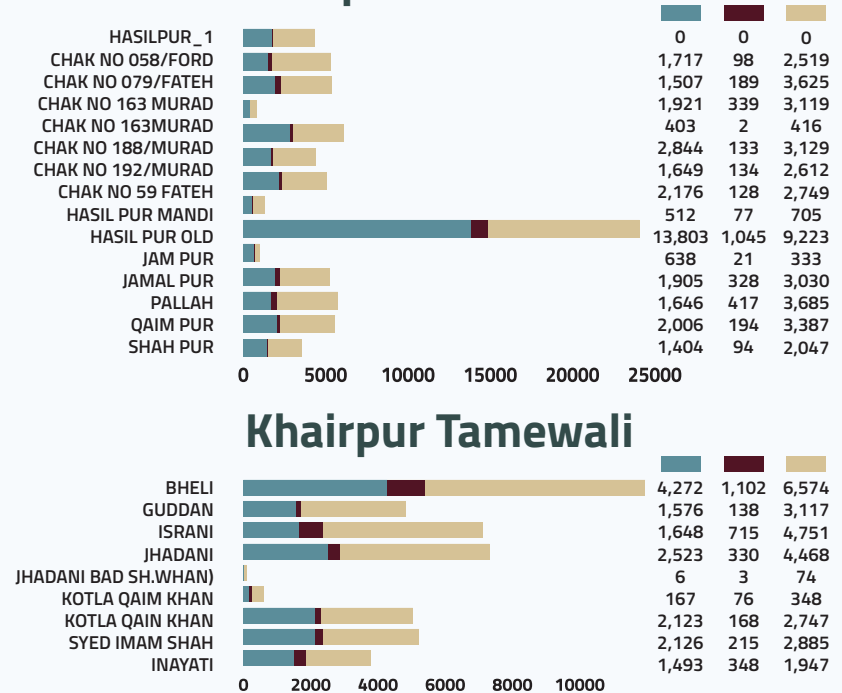


UC Wise Building Distribution

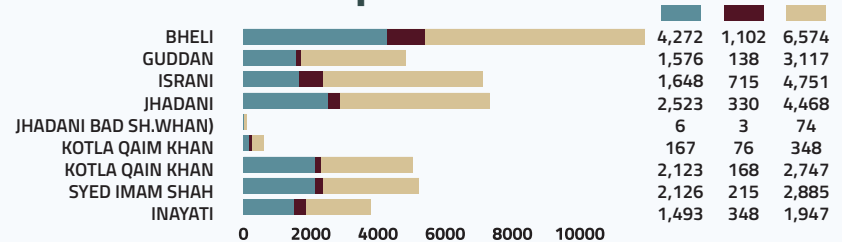
Ahmadpur East



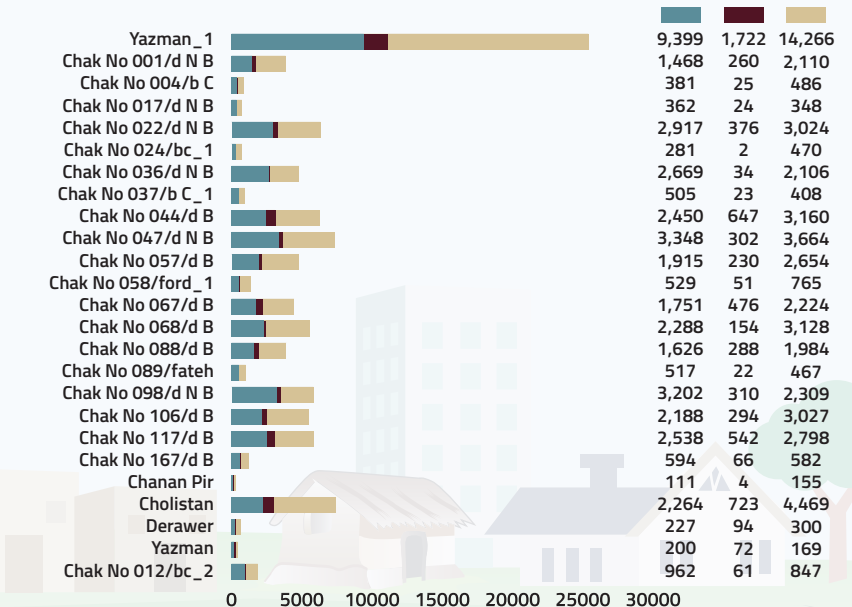
Hasilpur



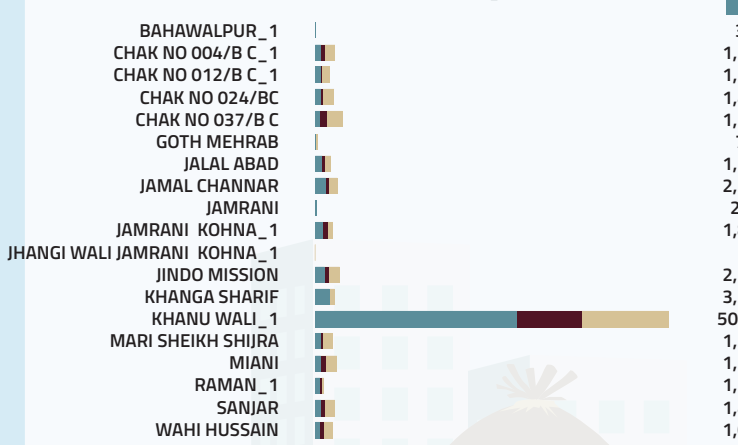
Khairpur Tamewali



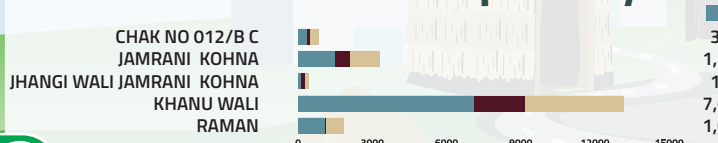
Yazman



Bahawalpur

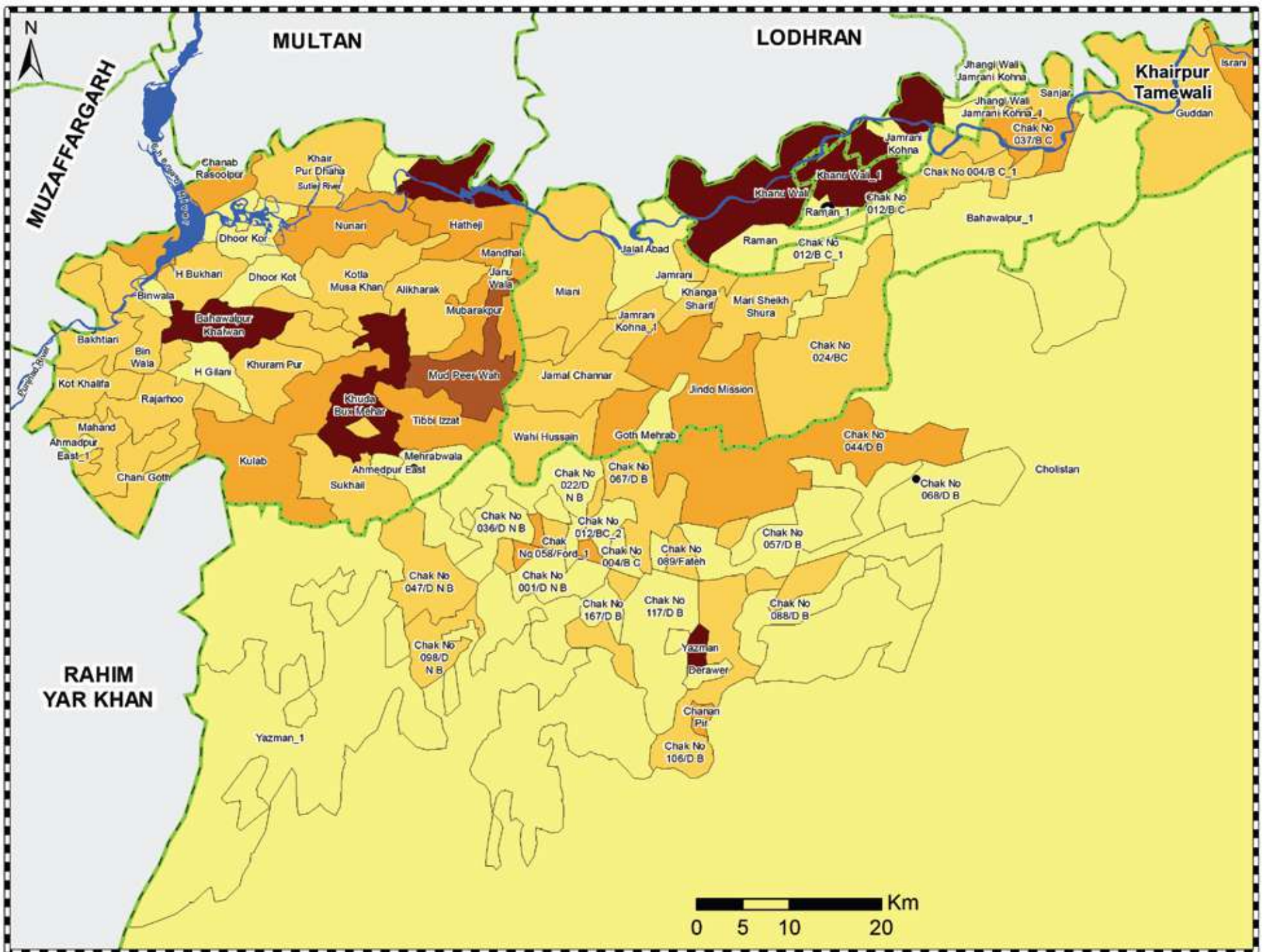
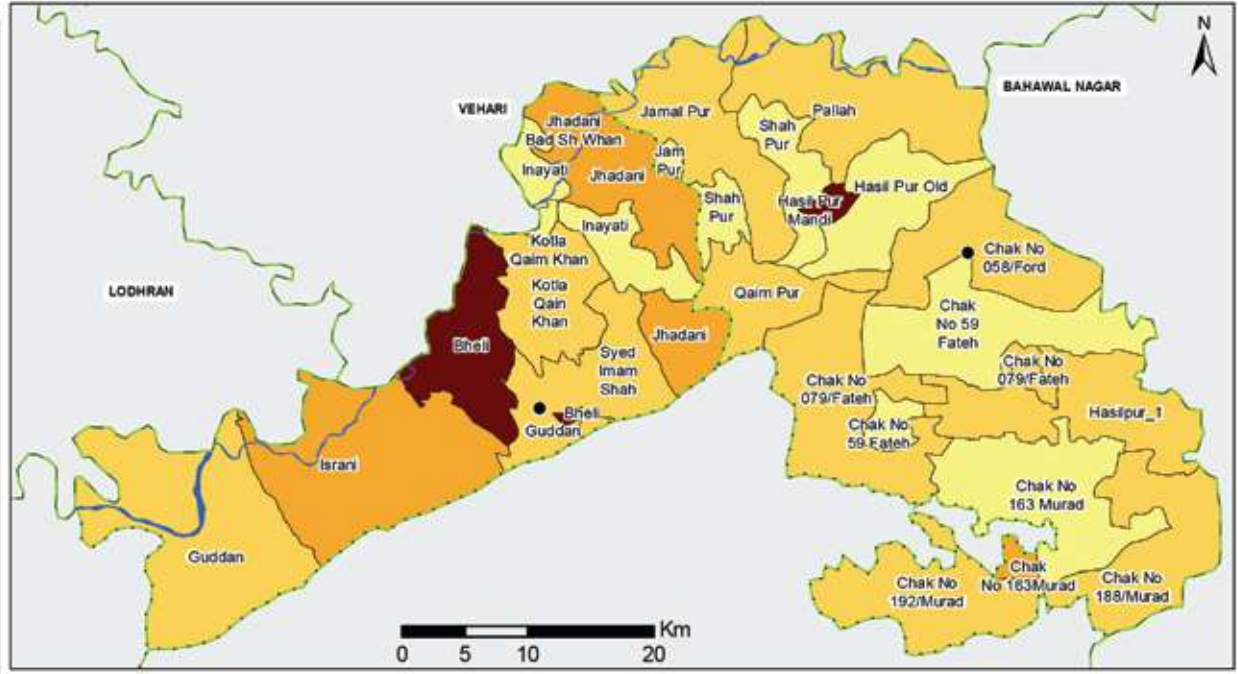
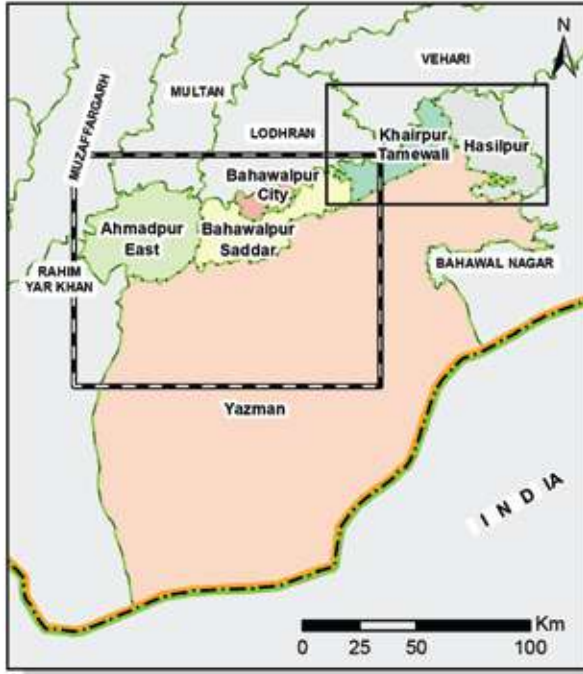


Bahawalpur City



■ Pacca
 ■ Semi Pacca
 ■ Kacha

BUILDING DISTRIBUTION (2015) MAP



Legend

- District Headquarter
- Tehsil Headquarter
- Building Distribution**
- Abc < 4000
- Abc 4000 - 6000
- Abc 6000 - 8000
- Abc 8000 - 10000
- Abc > 10000
- River and Water Body
- Abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
NDMA
Pakistan Bureau of Statistics

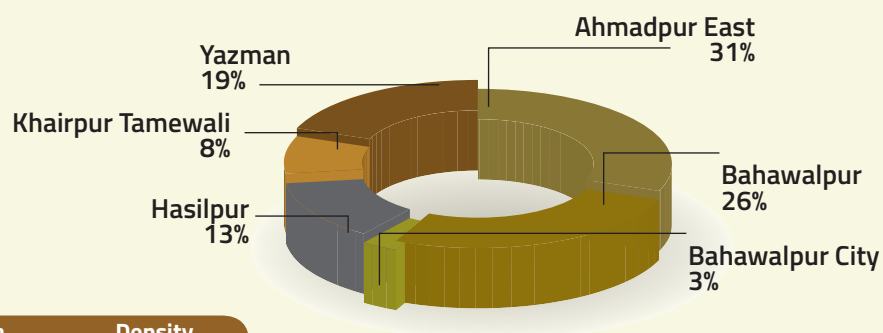
Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-008
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

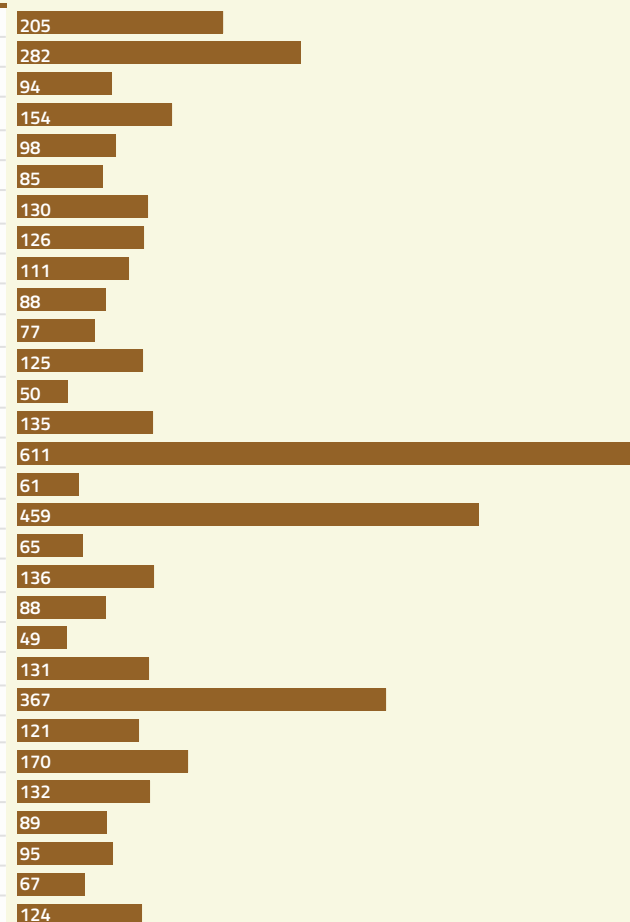
9 BUILDING DENSITY

There are variety of building groups in Bahawalpur, covering residential, nonresidential, office and administrative buildings, which are located in areas with relatively favorable geo-physical and socio-economic conditions.

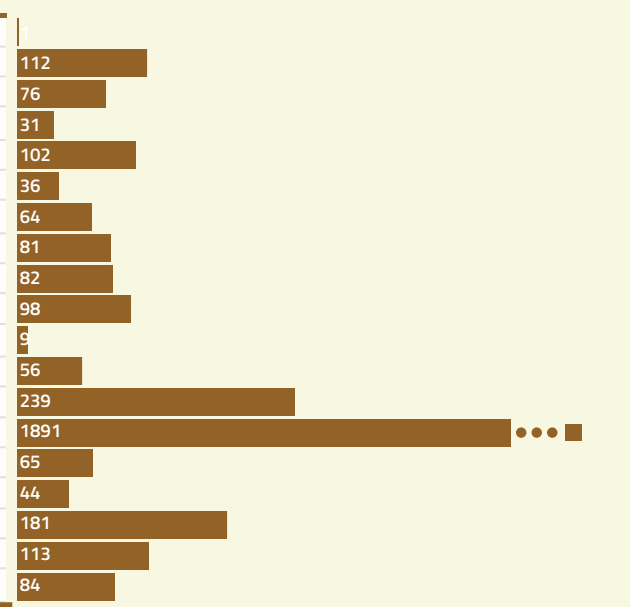
Tehsil Wise Building Density (Buildings / percentage)



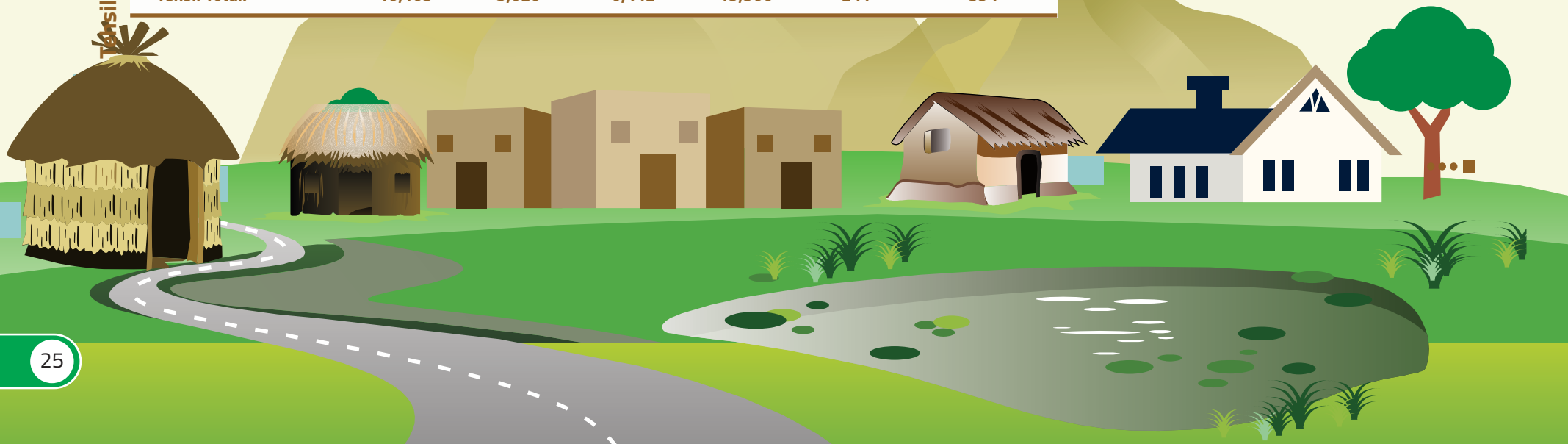
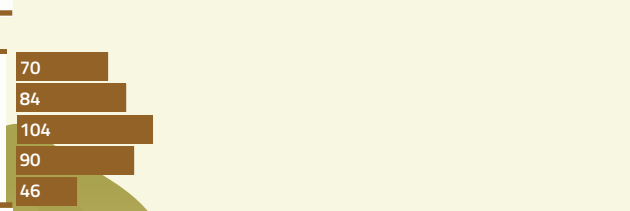
| Union Council | Building Types | | | Total Buildings | Area (sq.km) | Density (Buildings / sq.km) |
|----------------------|----------------|---------------|---------------|-----------------|--------------|-----------------------------|
| | Pacca | Semi Pacca | Kacha | | | |
| Ahmadpur East_1 | 679 | 4 | 343 | 1,026 | 5 | 205 |
| Ahmedpur East | 874 | 319 | 496 | 1,689 | 6 | 282 |
| Ali Kharak | 3,627 | 360 | 1,831 | 5,817 | 62 | 94 |
| Bahawalpur Khalwan | 6,009 | 2,103 | 5,465 | 13,577 | 88 | 154 |
| Bakhtiari | 2,418 | 101 | 2,791 | 5,310 | 54 | 98 |
| Bin Wala | 2,162 | 1,092 | 2,723 | 5,977 | 70 | 85 |
| Binwala | 671 | 23 | 350 | 1,043 | 8 | 130 |
| Chanab Rasoolpur | 1,901 | 394 | 3,898 | 6,193 | 49 | 126 |
| Chani Goth | 2,674 | 632 | 2,377 | 5,683 | 51 | 111 |
| Dhoor Kor | 1,197 | 149 | 1,198 | 2,545 | 29 | 88 |
| Dhoor Kot | 1,703 | 165 | 1,583 | 3,451 | 45 | 77 |
| H Bukhari | 2,181 | 477 | 2,232 | 4,890 | 39 | 125 |
| H Gilani | 840 | 290 | 977 | 2,106 | 42 | 50 |
| Hatheji | 2,593 | 612 | 3,158 | 6,363 | 47 | 135 |
| Janu Wala | 1,291 | 79 | 1,074 | 2,444 | 4 | 611 |
| Khair Pur Dhaha | 1,636 | 494 | 3,002 | 5,132 | 84 | 61 |
| Khuda Bux Mehar | 22,364 | 1,765 | 7,990 | 32,120 | 70 | 459 |
| Khuram Pur | 2,279 | 222 | 2,106 | 4,607 | 71 | 65 |
| Kot Khalifa | 3,036 | 293 | 2,399 | 5,728 | 42 | 136 |
| Kotla Musa Khan | 3,298 | 661 | 1,957 | 5,916 | 67 | 88 |
| Kulab | 2,840 | 869 | 2,532 | 6,241 | 128 | 49 |
| Mahand | 2,389 | 365 | 1,690 | 4,444 | 34 | 131 |
| Mandhal | 2,819 | 940 | 2,846 | 6,606 | 18 | 367 |
| Mehrabwala | 1,228 | 659 | 1,513 | 3,399 | 28 | 121 |
| Mubarakpur | 3,699 | 216 | 2,207 | 6,122 | 36 | 170 |
| Mud Peer Wah | 4,601 | 511 | 3,095 | 8,207 | 62 | 132 |
| Nunari | 3,096 | 357 | 2,613 | 6,065 | 68 | 89 |
| Rajarhoo | 2,227 | 365 | 2,361 | 4,954 | 52 | 95 |
| Sukhail | 2,948 | 66 | 1,538 | 4,552 | 68 | 67 |
| Tibbi Izzat | 4,268 | 443 | 1,982 | 6,693 | 54 | 124 |
| Tehsil Total: | 93,548 | 15,026 | 70,327 | 178,900 | 1,481 | 4,525 |



| | | | | | | |
|-----------------------------|---------------|---------------|---------------|----------------|--------------|--------------|
| Bahawalpur_1 | 38 | 66 | 140 | 244 | 204 | 1 |
| Chak No 004/b C_1 | 1,356 | 938 | 2,645 | 4,939 | 44 | 112 |
| Chak No 012/b C_1 | 1,342 | 340 | 1,827 | 3,508 | 46 | 76 |
| Chak No 024/bc | 1,498 | 331 | 2,890 | 4,718 | 153 | 31 |
| Chak No 037/b C | 1,222 | 1,664 | 3,948 | 6,834 | 67 | 102 |
| Goth Mehrab | 71 | 185 | 383 | 640 | 18 | 36 |
| Jalal Abad | 1,729 | 545 | 1,622 | 3,896 | 61 | 64 |
| Jamal Channar | 2,536 | 944 | 2,017 | 5,497 | 68 | 81 |
| Jamrani | 290 | 37 | 164 | 491 | 6 | 82 |
| Jamrani Kohna_1 | 1,898 | 1,077 | 1,438 | 4,412 | 45 | 98 |
| Jhangi Wali Jamrani Kohna_1 | 0 | 0 | 75 | 80 | 9 | 9 |
| Jindo Mission | 2,279 | 1,128 | 2,671 | 6,077 | 108 | 56 |
| Khanga Sharif | 3,514 | 124 | 1,133 | 4,772 | 20 | 239 |
| Khanu Wali_1 | 50,242 | 16,223 | 21,765 | 85,102 | 45 | 1,891 |
| Mari Sheikh Shijra | 1,318 | 614 | 2,256 | 4,188 | 64 | 65 |
| Miani | 1,317 | 1,248 | 2,849 | 5,413 | 124 | 44 |
| Raman_1 | 1,195 | 316 | 659 | 2,170 | 12 | 181 |
| Sanjar | 1,409 | 1,003 | 2,464 | 4,875 | 43 | 113 |
| Wahi Hussain | 1,058 | 1,156 | 2,006 | 4,221 | 50 | 84 |
| Tehsil Total: | 74,321 | 27,939 | 52,952 | 152,077 | 1,187 | 3,365 |



| | | | | | | |
|----------------------|---------------|--------------|--------------|---------------|------------|------------|
| Chak No 012/b C | 351 | 122 | 363 | 836 | 12 | 70 |
| Jamrani Kohna | 1,477 | 630 | 1,186 | 3,293 | 39 | 84 |
| Jhangi Wali Jamrani | 115 | 139 | 163 | 417 | 4 | 104 |
| Khanu Wali | 7,096 | 2,080 | 3,985 | 13,162 | 146 | 90 |
| Raman | 1,064 | 49 | 745 | 1,858 | 40 | 46 |
| Tehsil Total: | 10,103 | 3,020 | 6,442 | 19,566 | 241 | 394 |



| Tehsil Hasilpur | | | | | | | |
|----------------------|---------------|--------------|---------------|---------------|--------------|--------------|------|
| Hasilpur_1 | 0 | 0 | 0 | 4,334 | 100 | 43 | 43 |
| Chak No 058/ford | 1,717 | 98 | 2,519 | 5,320 | 88 | 60 | 60 |
| Chak No 079/fateh | 1,507 | 189 | 3,625 | 5,378 | 125 | 43 | 43 |
| Chak No 163 Murad | 1,921 | 339 | 3,119 | 821 | 105 | 8 | 8 |
| Chak No 163murad | 403 | 2 | 416 | 6,106 | 7 | 872 | 872 |
| Chak No 188/murad | 2,844 | 133 | 3,129 | 4,395 | 89 | 49 | 49 |
| Chak No 192/murad | 1,649 | 134 | 2,612 | 5,052 | 88 | 57 | 57 |
| Chak No 59 Fateh | 2,176 | 128 | 2,749 | 1,294 | 116 | 11 | 11 |
| Hasil Pur Mandi | 512 | 77 | 705 | 24,072 | 8 | 3,009 | 3009 |
| Hasil Pur Old | 13,803 | 1,045 | 9,223 | 0 | 64 | 0 | 0 |
| Jam Pur | 638 | 21 | 333 | 992 | 4 | 248 | 248 |
| Jamal Pur | 1,905 | 328 | 3,030 | 5,263 | 95 | 55 | 55 |
| Pallah | 1,646 | 417 | 3,685 | 5,748 | 124 | 46 | 46 |
| Qaim Pur | 2,006 | 194 | 3,387 | 5,587 | 53 | 105 | 105 |
| Shah Pur | 1,404 | 94 | 2,047 | 3,545 | 55 | 64 | 64 |
| Tehsil Total: | 34,131 | 3,199 | 40,574 | 77,907 | 1,121 | 4,670 | |

| Tehsil Khairpur Tamewali | | | | | | | |
|--------------------------|---------------|--------------|---------------|---------------|------------|------------|-----|
| Bheli | 4,272 | 1,102 | 6,574 | 11,948 | 73 | 164 | 164 |
| Guddan | 1,576 | 138 | 3,117 | 4,831 | 175 | 28 | 28 |
| Israni | 1,648 | 715 | 4,751 | 7,114 | 158 | 45 | 45 |
| Jhadani | 2,523 | 330 | 4,468 | 7,320 | 118 | 62 | 62 |
| Jhadani Bad Sh.whan) | 6 | 3 | 74 | 84 | 3 | 28 | 28 |
| Kotla Qaim Khan | 167 | 76 | 348 | 591 | 3 | 197 | 197 |
| Kotla Qain Khan | 2,123 | 168 | 2,747 | 5,038 | 65 | 78 | 78 |
| Syed Imam Shah | 2,126 | 215 | 2,885 | 5,226 | 81 | 65 | 65 |
| Inayati | 1,493 | 348 | 1,947 | 3,788 | 48 | 79 | 79 |
| Tehsil Total: | 15,934 | 3,095 | 26,911 | 45,940 | 724 | 746 | |

| Tehsil Yazman | | | | | | | |
|------------------------|----------------|---------------|----------------|----------------|--------------|--------------|------|
| Yazman_1 | 9,399 | 1,722 | 14,266 | 3,838 | 898 | 4 | 4 |
| Chak No 001/d N B | 1,468 | 260 | 2,110 | 892 | 46 | 19 | 19 |
| Chak No 004/b C | 381 | 25 | 486 | 1,870 | 12 | 156 | 156 |
| Chak No 017/d N B | 362 | 24 | 348 | 6,317 | 9 | 702 | 702 |
| Chak No 022/d N B | 2,917 | 376 | 3,024 | 753 | 72 | 10 | 10 |
| Chak No 024/bc_1 | 281 | 2 | 470 | 4,808 | 4 | 1,202 | 1202 |
| Chak No 036/d N B | 2,669 | 34 | 2,106 | 936 | 35 | 27 | 27 |
| Chak No 037/b C_1 | 505 | 23 | 408 | 6,257 | 4 | 1,564 | 1564 |
| Chak No 044/d B | 2,450 | 647 | 3,160 | 7,314 | 179 | 41 | 41 |
| Chak No 047/d N B | 3,348 | 302 | 3,664 | 4,799 | 62 | 77 | 77 |
| Chak No 057/d B | 1,915 | 230 | 2,654 | 1,345 | 83 | 16 | 16 |
| Chak No 058/ford_1 | 529 | 51 | 765 | 4,451 | 14 | 318 | 318 |
| Chak No 067/d B | 1,751 | 476 | 2,224 | 5,570 | 81 | 69 | 69 |
| Chak No 068/d B | 2,288 | 154 | 3,128 | 3,899 | 96 | 41 | 41 |
| Chak No 088/d B | 1,626 | 288 | 1,984 | 1,006 | 41 | 25 | 25 |
| Chak No 089/fateh | 517 | 22 | 467 | 5,821 | 19 | 306 | 306 |
| Chak No 098/d N B | 3,202 | 310 | 2,309 | 5,509 | 55 | 100 | 100 |
| Chak No 106/d B | 2,188 | 294 | 3,027 | 5,878 | 82 | 72 | 72 |
| Chak No 117/d B | 2,538 | 542 | 2,798 | 1,242 | 82 | 15 | 15 |
| Chak No 167/d B | 594 | 66 | 582 | 270 | 16 | 17 | 17 |
| Chanan Pir | 111 | 4 | 155 | 7,456 | 6 | 1,243 | 1243 |
| Cholistan | 2,264 | 723 | 4,469 | 621 | 1,726 | 1 | 1 |
| Derawer | 227 | 94 | 300 | 441 | 8 | 55 | 55 |
| Yazman | 200 | 72 | 169 | 25,388 | 8 | 3,174 | 3174 |
| Chak No 012/bc_2 | 962 | 61 | 847 | 734 | 22 | 33 | 33 |
| Tehsil Total: | 44,692 | 6,802 | 55,920 | 107,415 | 3,660 | 9,287 | |
| District Total: | 272,720 | 59,081 | 253,131 | 581,805 | 8,414 | 223 | |



Effective and efficient transportation system is one of the basic requirements for the protection of socio-economic wellbeing of a state. Roads and other means of transportation systems play a vital role in providing better employment opportunities, health services and accessibilities to markets and basic facilities.

The district has metalled road-length of 2678.27 Kilometers which is linked with Lodhran, Bahawalnagar, Vehari and Rahimyar Khan. M-5 Khanewal-Bahawalpur (Lodhran) section is expected to be completed in 2016 . The main Peshawar-Karachi railway line passes through Bahawalpur District. The district is linked with Rahim Yar Khan, Hasilpur and Lodhran through railway network . Besides there are three airports in Bahawalpur district.

Road Length (km)

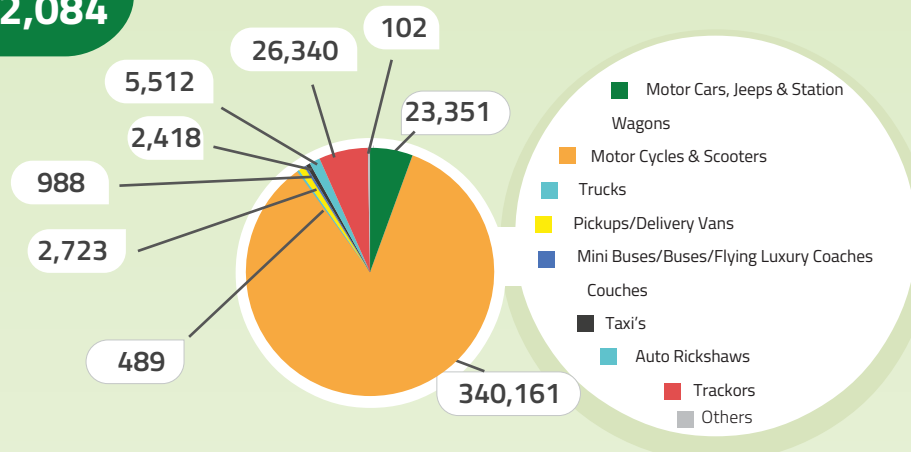


Motor Vehicles 'Registered'

by Type as on 30th June, 2014

| Icon | Category | Count |
|------|--|---------|
| | Mini Buses / Buses / Flying Luxury Coaches | 988 |
| | Motor Cars, Jeeps & Station Wagons | 23,351 |
| | Pickups / Delivery Vans | 2,723 |
| | Motor Cycles & Scooters | 340,161 |
| | Trucks | 489 |
| | Auto Rickshaws | 5,512 |
| | Tractors | 26,340 |
| | Taxi's | 2,418 |
| | Others | 102 |

Total: 402,084



Nearest Major Airports from Rahimyar Khan City



Number of Railway Stations



209 km

Dera Ghazi Khan International Airport



113 km

Multan International Airport



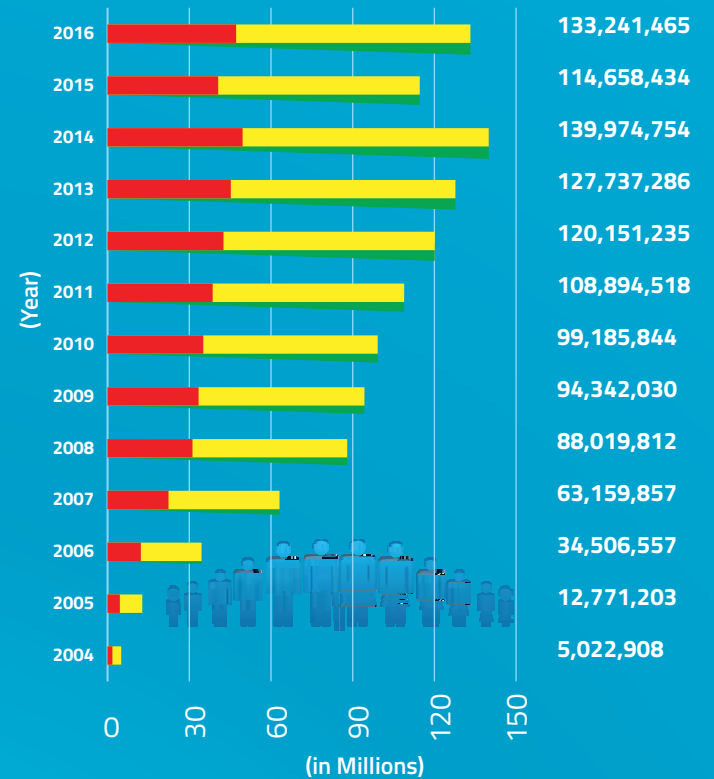
TRANSPORTATION NETWORK MAP

Communication System; particularly telecommunication services, plays a role of significant importance in connecting distant people either through wired or wireless voice services. These telecommunication technologies have been changed immensely in the last twenty years. Before the emergence of cellular systems, the communication system of District Multan was primarily based on telephone services, known as Public Service Telephone Systems (PSTNS). However, with worldwide expansion/growth and recognition of wireless communication systems, cellular systems have also been deployed in the district.

There are 41 telephone exchanges operating in the district, ranging in capacities from 250 lines to 10,000 lines. Cellular phone services are available in the district.

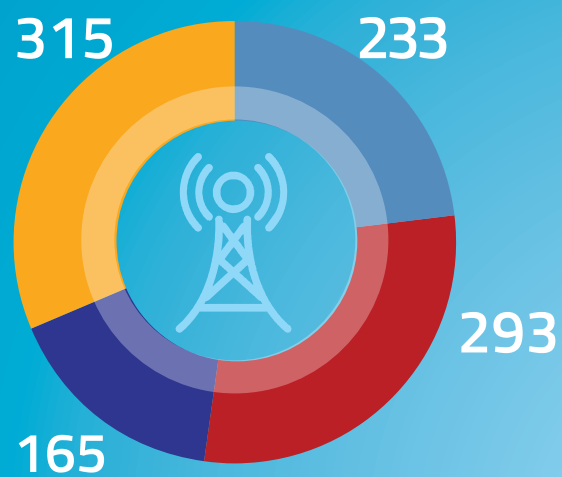
The Cellular Service Providers in the districts include Mobilink, Telenor, Ufone, Warid and Zong. The map on right, identifies total number of telecommunication towers distributed over the different parts of the district.

Cellular Subscribers in Pakistan



Tehsil Wise Distribution of Cellular Communication Towers

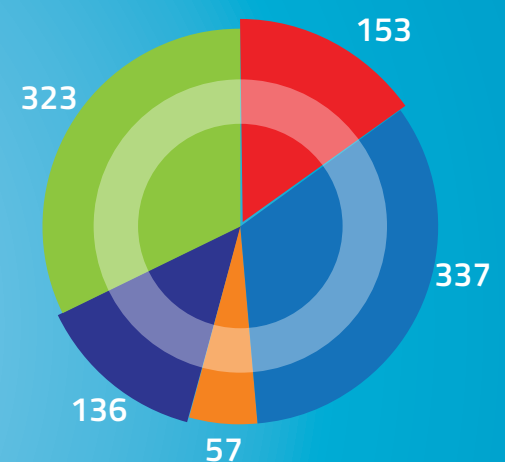
Legend: Ahmadpur East (Red), Bahawalpur (Blue), Bahawalpur City (Green), Yazman (Orange)



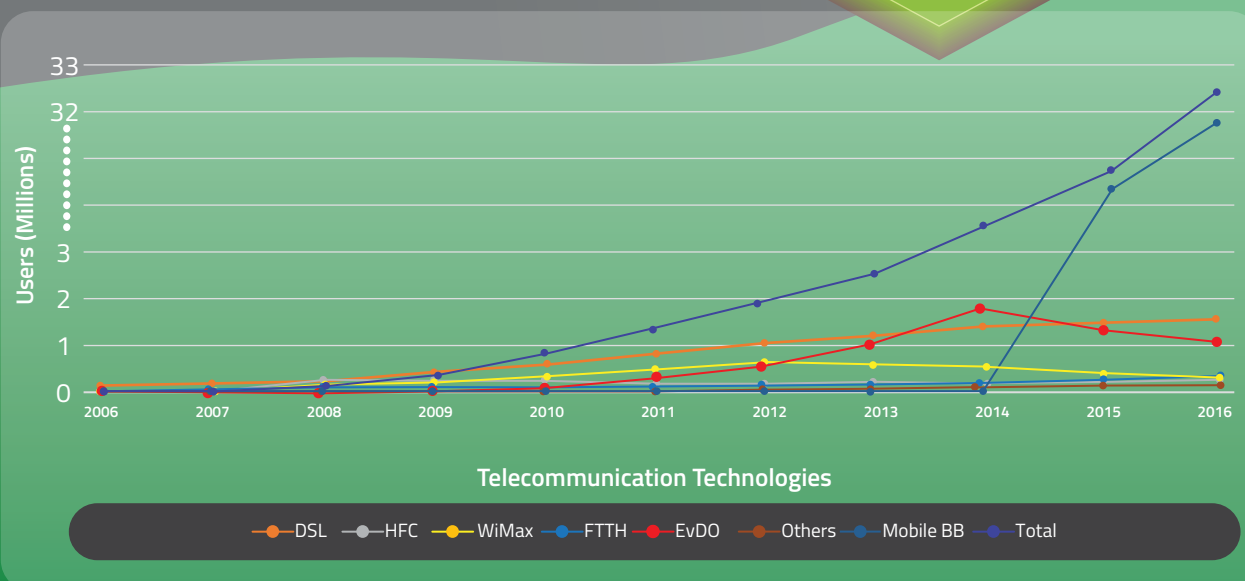
Total: 1,006

Network Wise Distribution of Cellular Towers (in Rahimyar Khan District)

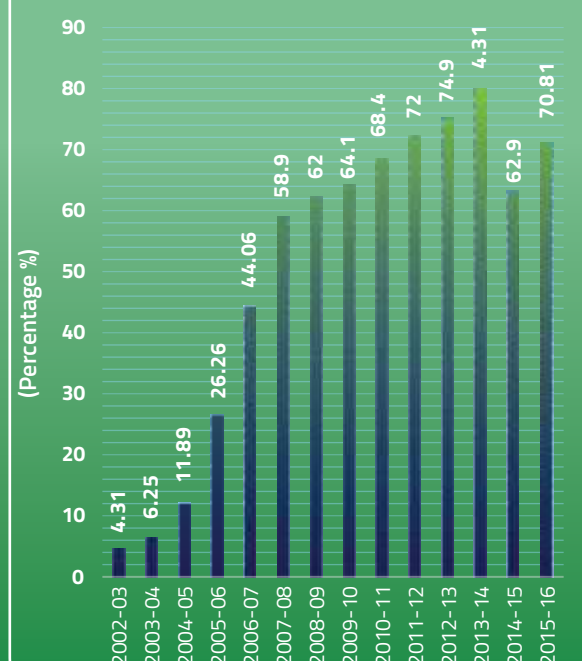
Legend: Mobilink (Red), Telenor (Blue), Ufone (Orange), Warid (Green), Zong (Purple)



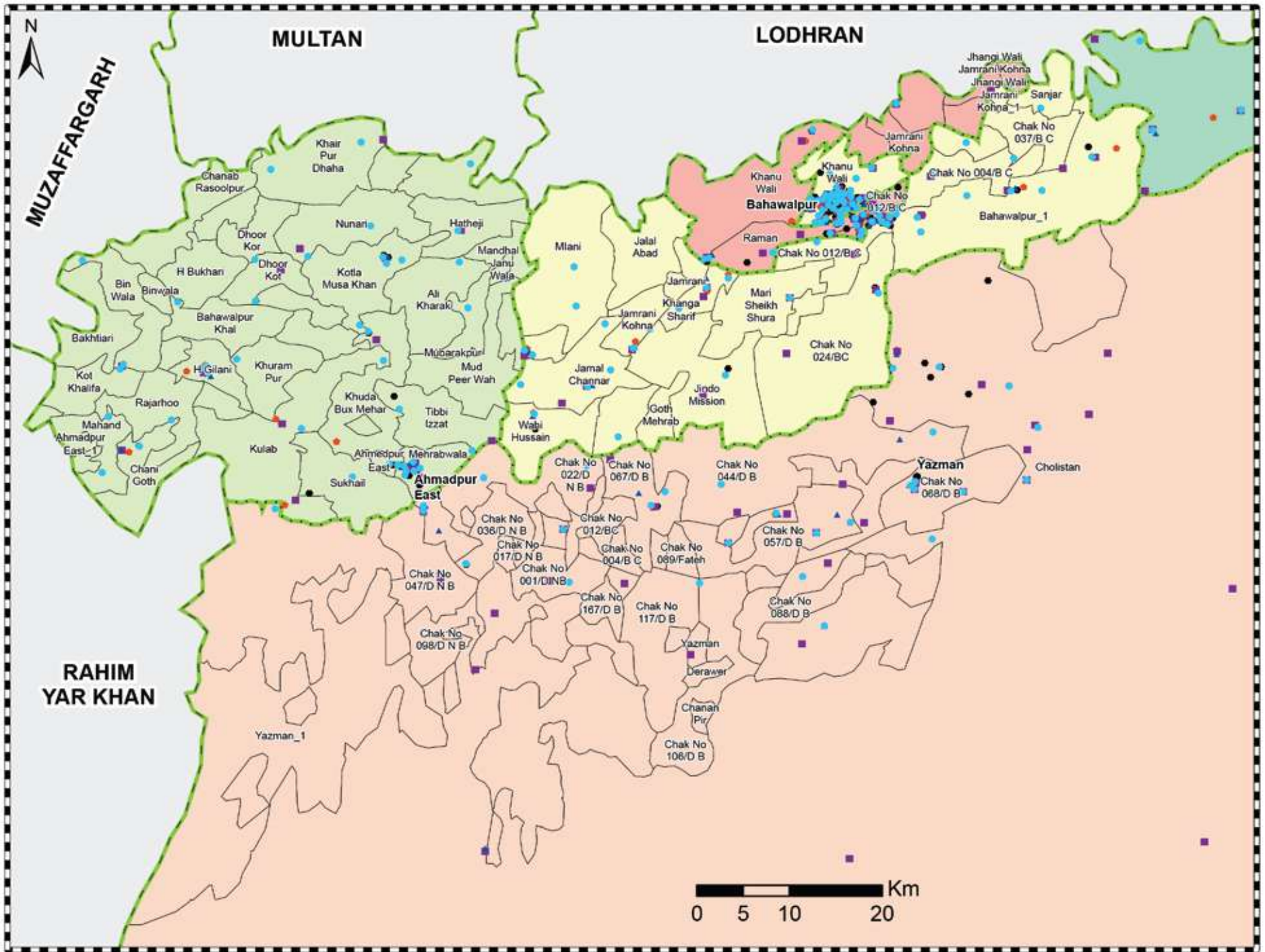
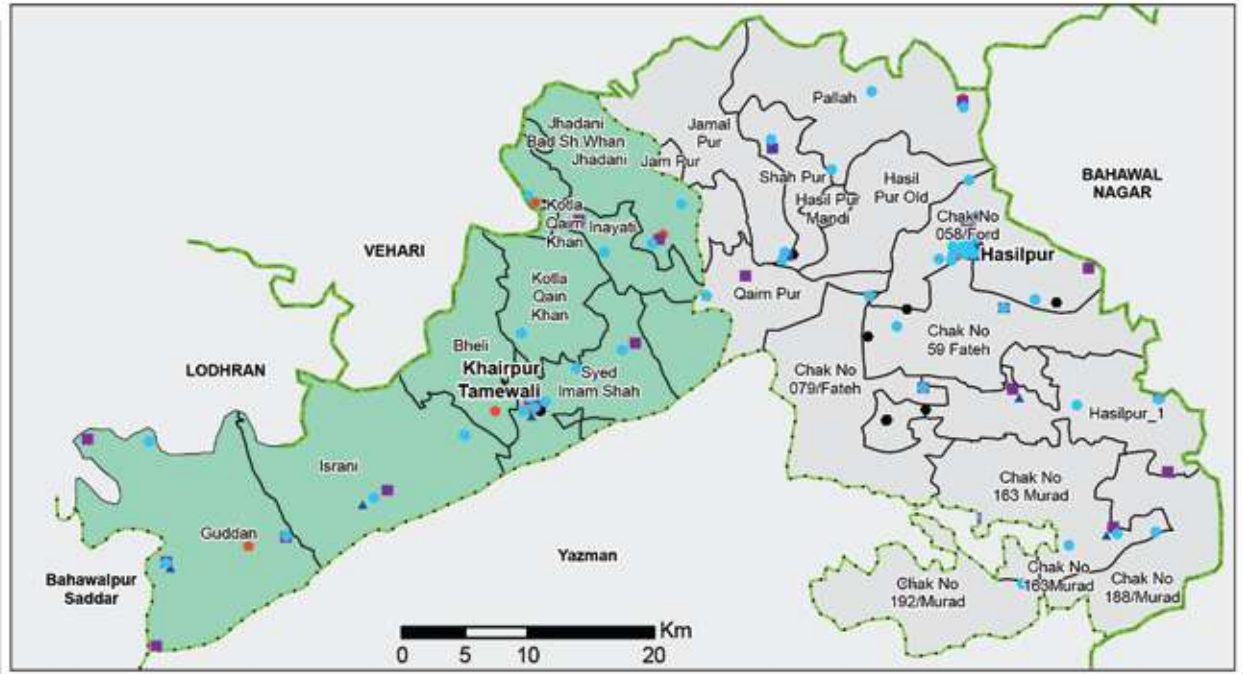
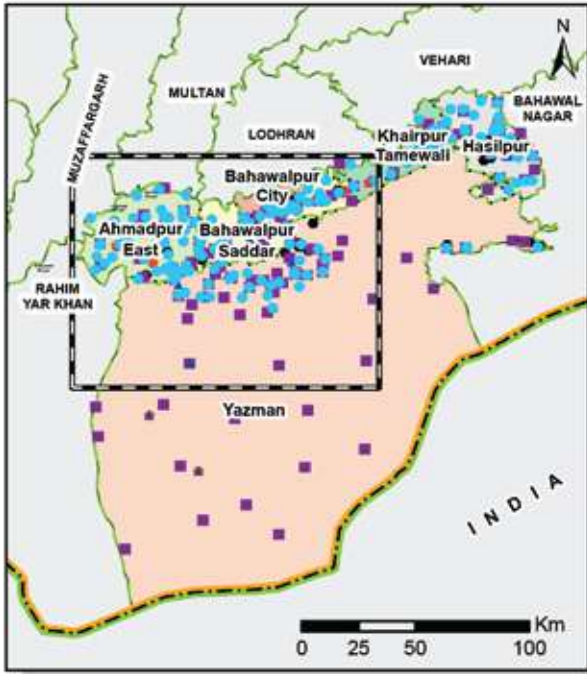
Internet Subscribers in Pakistan



Teledensity in Pakistan



COMMUNICATION TOWER MAP



Legend

- District Headquarter
- Tehsil Headquarter

Network

- Mobilink
- Telenor
- ▲ Ufone
- Warid
- Zong

Tehsil Boundary

- Ahmadpur East
- Bahawalpur City
- Bahawalpur Saddar
- Hasilpur
- Khairpur Tamewali
- Yazman
- ABC District Boundary

Other Symbols

- ▬ Provincial Boundary
- ▬ Line of Control
- ▬ International Boundary
- Abc Union Council Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
Pakistan Telecommunication Authority
Survey of Pakistan
Pakistan Bureau of Statistics

Datum: WGS 1984
Units: Degree

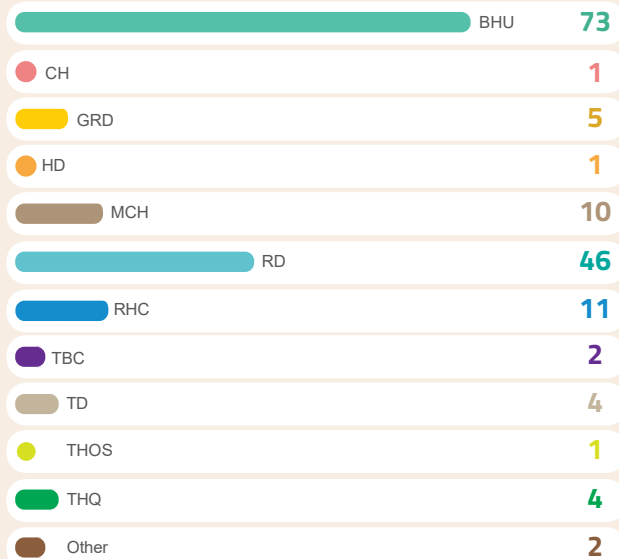
Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-001
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

The provision of easily accessible, affordable and quality Health care facilities is among the basic amenities of life that must be provided to the people for their wellbeing and health safety. Health facilities include hospitals, clinics, maternal & birth centers, dispensaries and other forms of

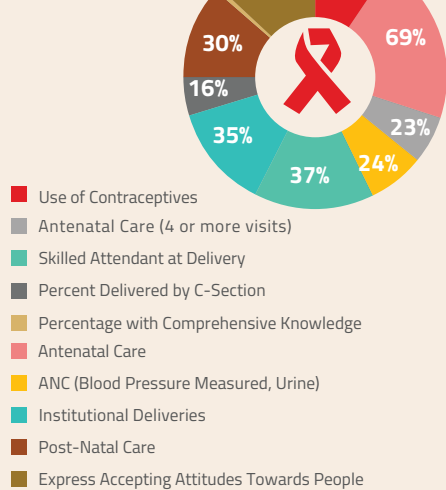
health care centers.

In district Bahawalpur, for 4.451 population there is one certified doctor available in public healthcare facilities.

Health Facilities by Type



Reproductive Health (HIV /AIDS Statistics)



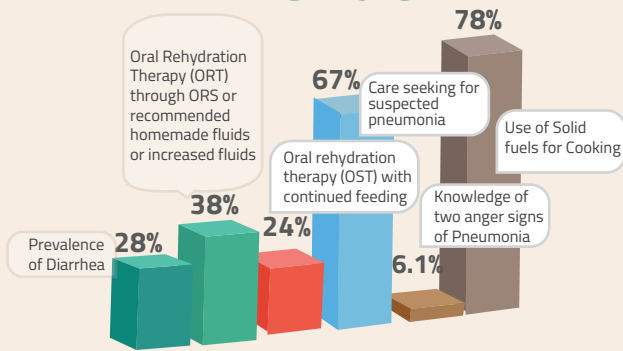
Primary Healthcare Sanctioned Staff

| Health Facility Type | Medical Officers & Surgeons | Nurse (Head/Staff/Charge) | Assistants (Medical/Xray/Lab/Dental) | LHVs / LHWs / Midwives / Vaccinators | Medical Tech/Dispenser | Others |
|----------------------|-----------------------------|---------------------------|--------------------------------------|--------------------------------------|------------------------|--------|
| BHU | 73 | 0 | 16 | 1277 | 134 | 444 |
| MCH | 0 | 0 | 0 | 177 | 0 | 10 |
| RD | 1 | 0 | 0 | 45 | 46 | 51 |
| RHC | 44 | 64 | 33 | 380 | 53 | 329 |
| TD | 0 | 0 | 0 | 0 | 0 | 12 |
| GRD | 5 | 0 | 1 | 22 | 0 | 10 |
| TBC | 2 | 0 | 4 | 4 | 2 | 8 |
| HD | 0 | 0 | 0 | 0 | 0 | 3 |
| Other | 2 | 0 | 1 | 0 | 2 | 52 |

Secondary Healthcare Sanctioned Staff

| Health Facility Type | MS/AMS/Deputy MS | PMO/AP MO/CMO/SMO/MO | PWMO/A PWMO/S WMO/W MO | Specialists (Eye/ENT/Chest/Child/Surgical/Medical) | Surgeons (Cardio/Neuro/Ortho/Gyne/Dental) | Non Surgical Staff (Anesthetist/pathologist/Radiologist/Physiotherapists) | Assistants (Lab/Medical/X-Ray/Dental/ECG Techs) | Nurse (Head/Staff Nurse/Matron) | LHVS/LHWS/Midwives/EPI Vaccinators/LHWs | Health/Medical Tech/Dispensers | Other |
|----------------------------|------------------|----------------------|------------------------|--|---|---|---|---------------------------------|---|--------------------------------|-------|
| Tehsil Headquarters (THQs) | 4 | 72 | 23 | 16 | 16 | 13 | 25 | 86 | 211 | 26 | 262 |
| HOSP | 12 | 210 | 100 | 55 | 27 | 18 | 70 | 621 | 5 | 74 | 1 |
| THOS | 7 | 120 | 0 | 0 | 1 | 3 | 13 | 176 | 0 | 12 | 1 |

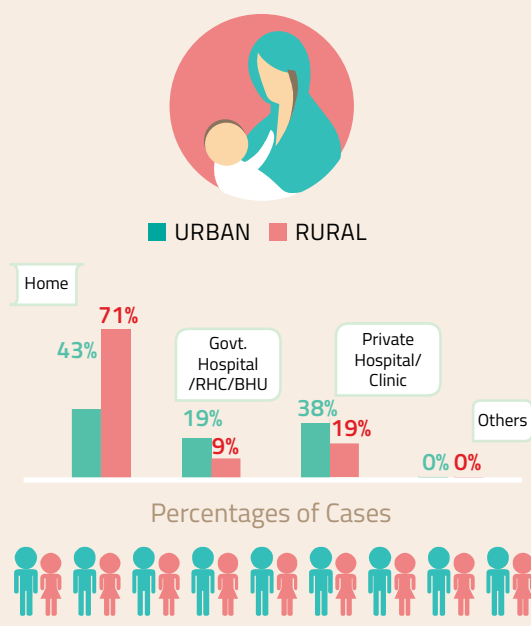
Statistics of Disease in Children



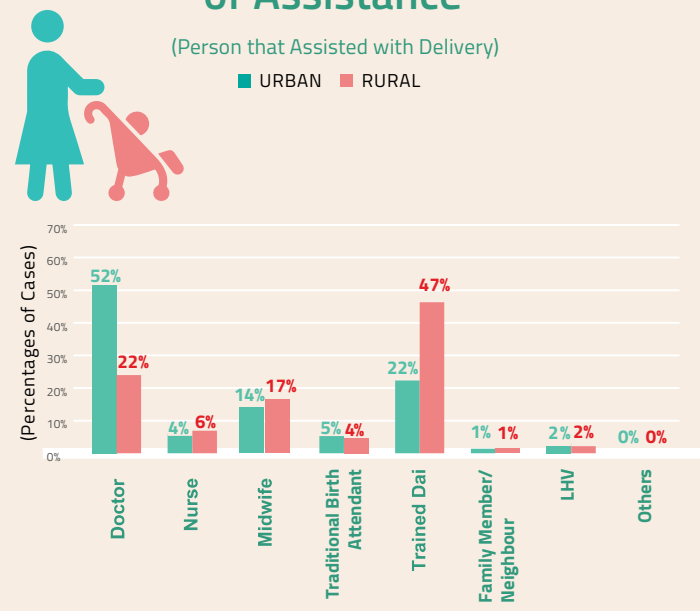
Child Mortality Statistics



Child Delivery by Location

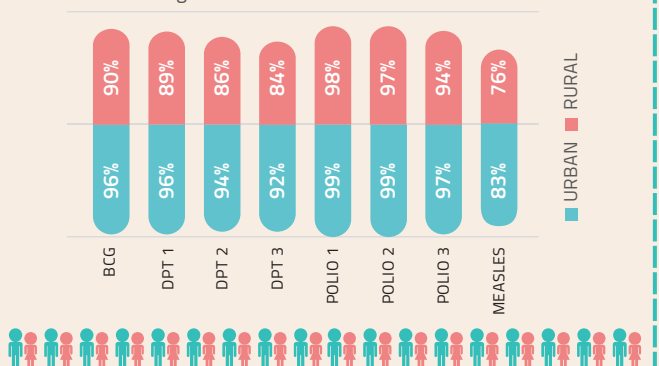


Child Delivery by Type of Assistance

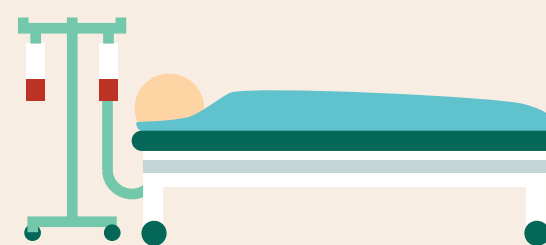


Children 12-23 Months

That have been immunized by type of antigen- based on record and recall

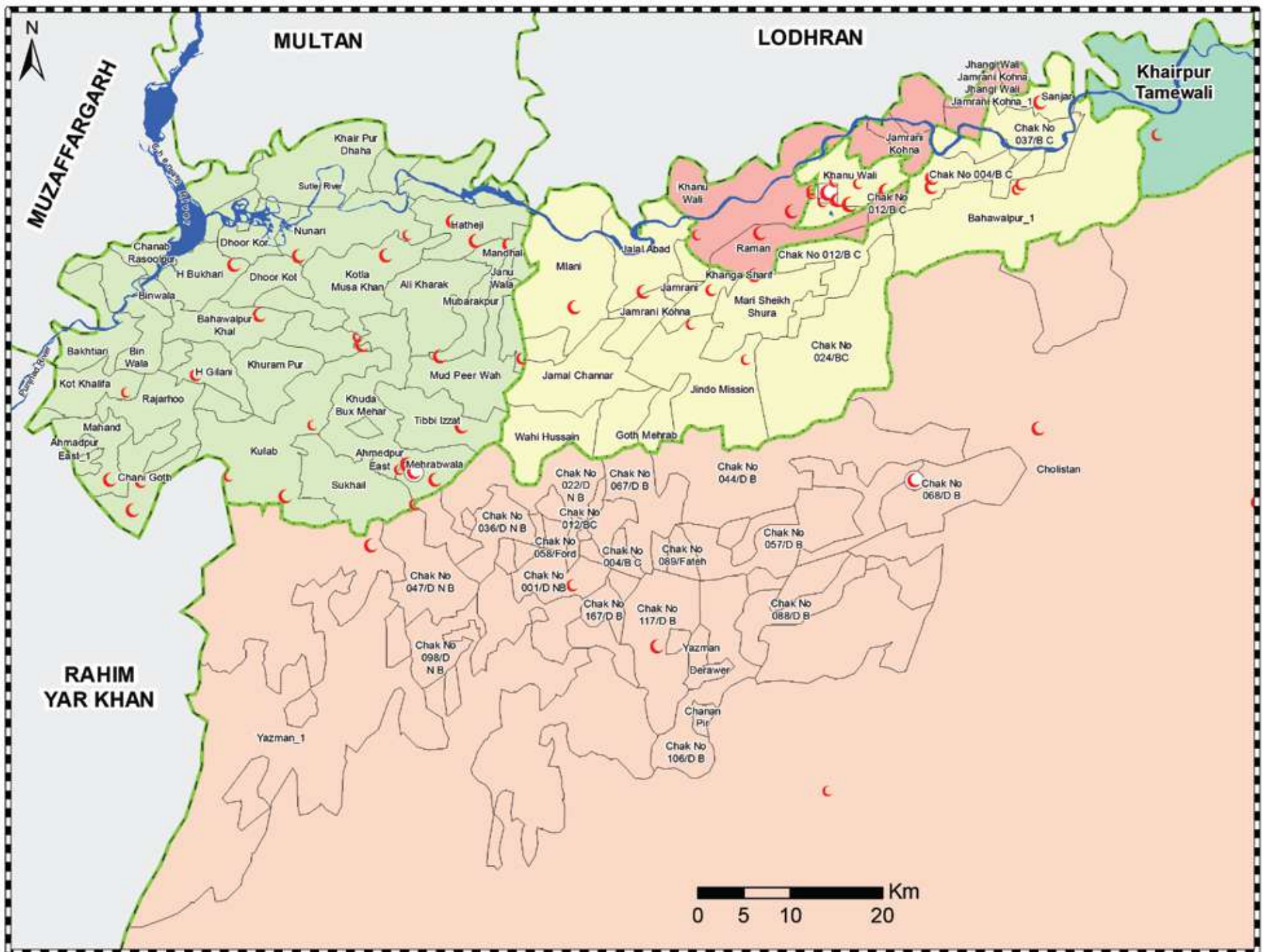
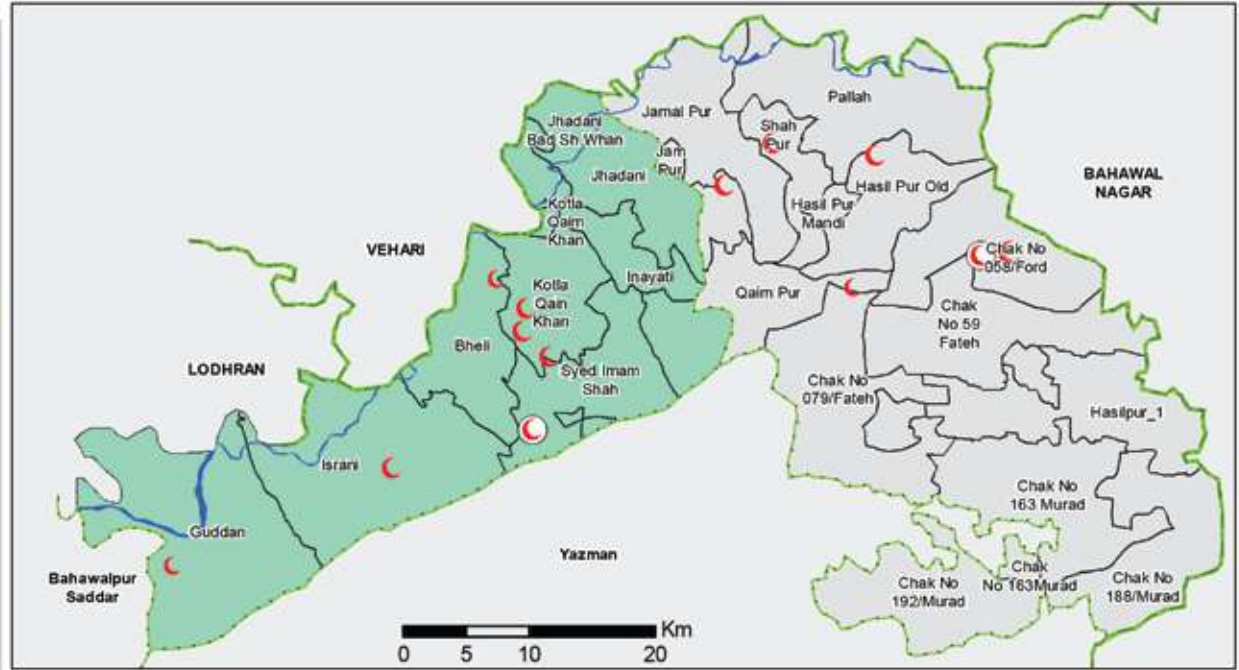
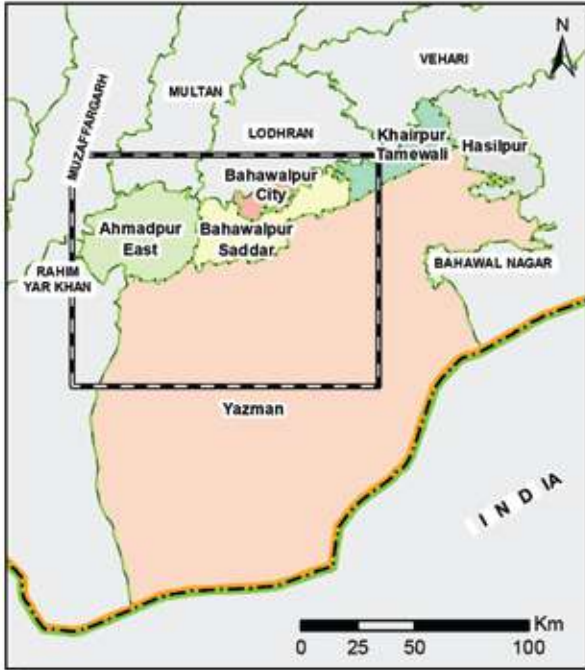


Tehsil Wise Bedding Capacity in Healthcare Facilities



■ BHU ■ DHQ ■ UD ■ MCH ■ RHC ■ THQ ■ RD ■ THOS ■ OTHER

HEALTH FACILITIES MAP



Legend

- | | |
|--------------------------------------|------------------------|
| District Headquarter Hospital | Line of Control |
| Tehsil Headquarter Hospital | International Boundary |
| Civil Hospital & Tuberculosis Clinic | Tehsil Boundary |
| Basic Health Unit | Ahmadpur East |
| Rural Health Centre | Bahawalpur City |
| Maternal/Child Health Centre | Bahawalpur Saddar |
| River and Water Body | Hasilpur |
| Union Council Boundary | Khairpur Tamewali |
| District Boundary | Yazman |
| Provincial Boundary | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan



MAP INFORMATION

Data Source(s):

World Health Organization
Health Department Punjab

Datum: WGS 1984
Units: Degree

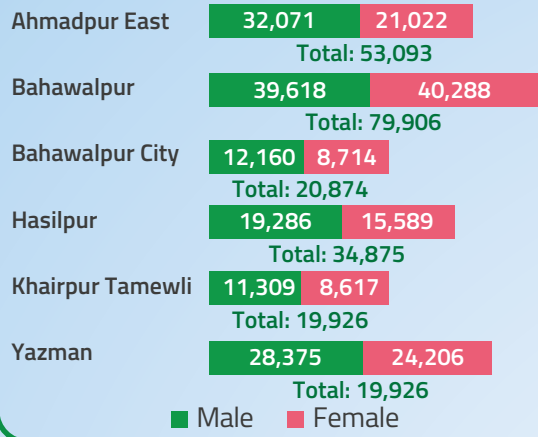
Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-013
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017



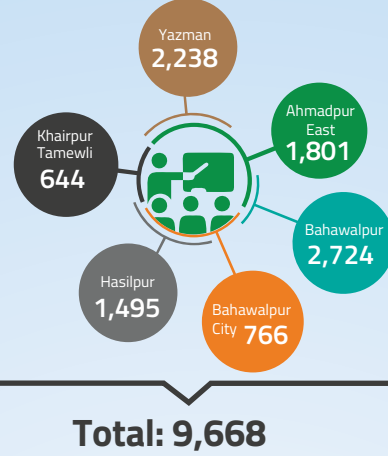
Education Facilities



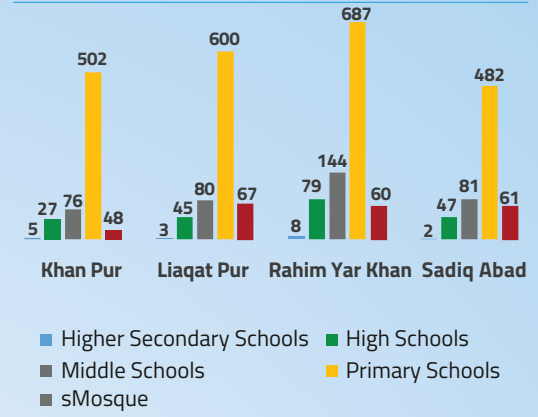
Total Enrollment by Gender



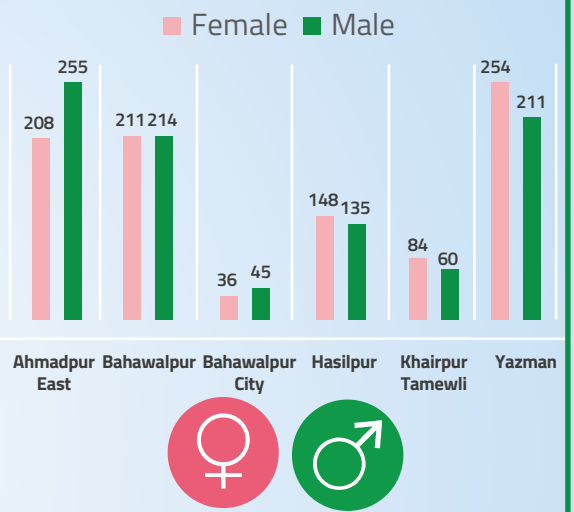
Number of Teachers



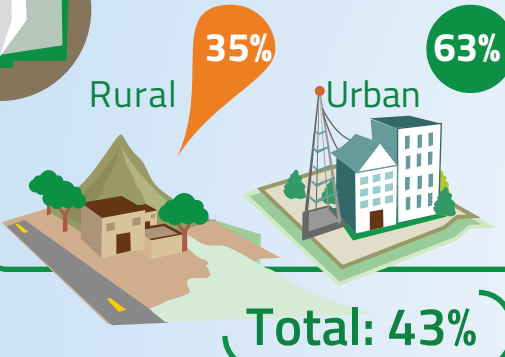
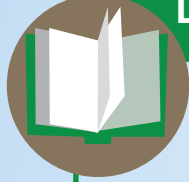
Tehsil Wise Govt. School by Type



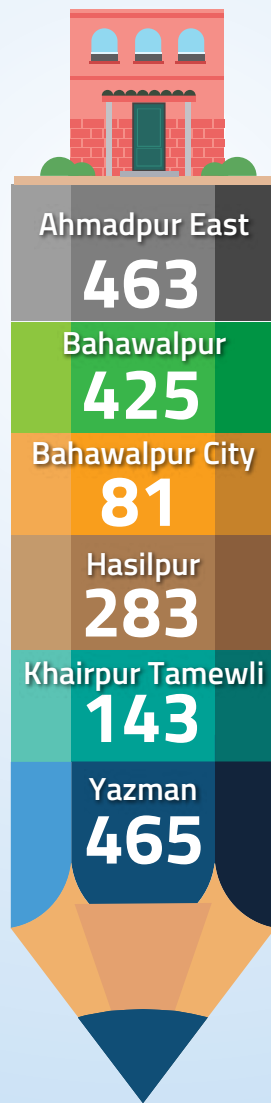
Tehsil Wise Govt. School by Gender



Literacy Ratio 2015-2016



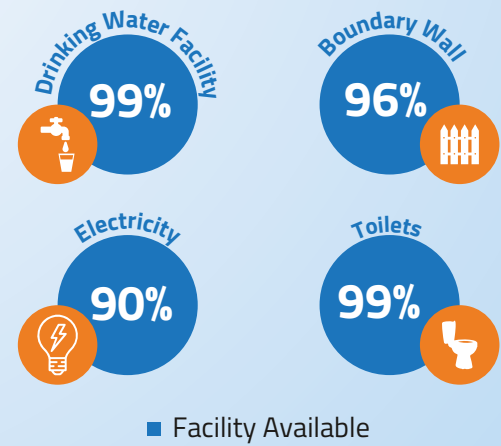
Total School Buildings



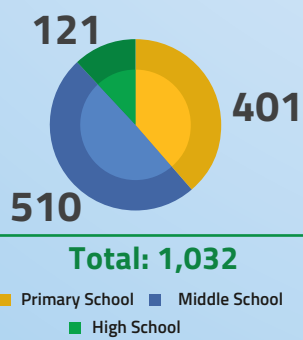
Tehsil Wise Govt. School by Building Type

| Tehsils | Kacha | Semi Pacca | Pacca | Total |
|------------------|-------|------------|-------|-------|
| Ahmadpur East | 21 | 11 | 431 | 463 |
| Bahawalpur | 11 | 14 | 400 | 425 |
| Bahawalpur City | 4 | 3 | 74 | 81 |
| Hasilpur | 7 | 10 | 266 | 283 |
| Khairpur Tamewli | 5 | - | 138 | 143 |
| Yazman | 35 | 3 | 427 | 465 |
| Total: | 83 | 41 | 1,736 | 1,860 |

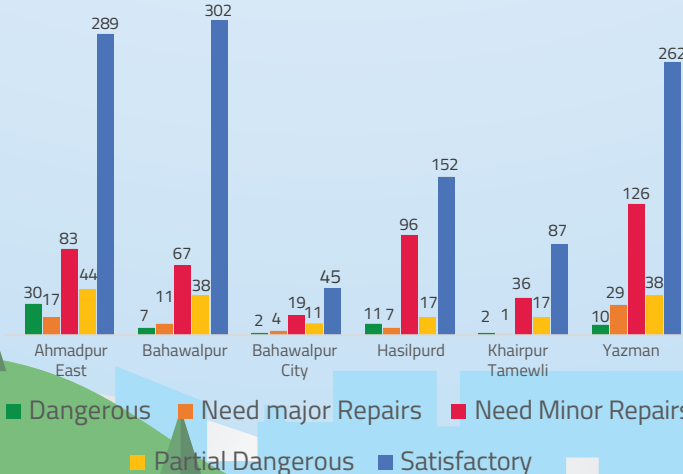
Tehsil Wise Facilities in Schools



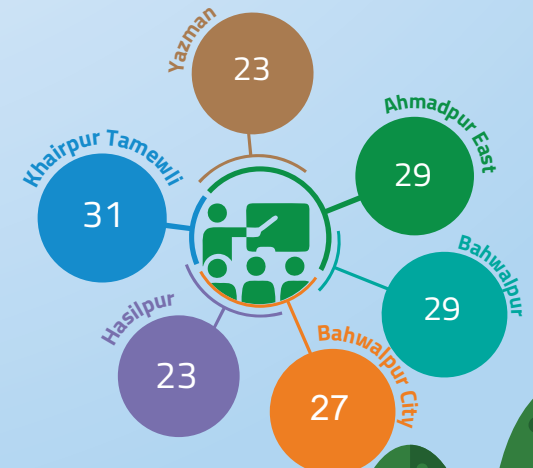
Private Education Facilities



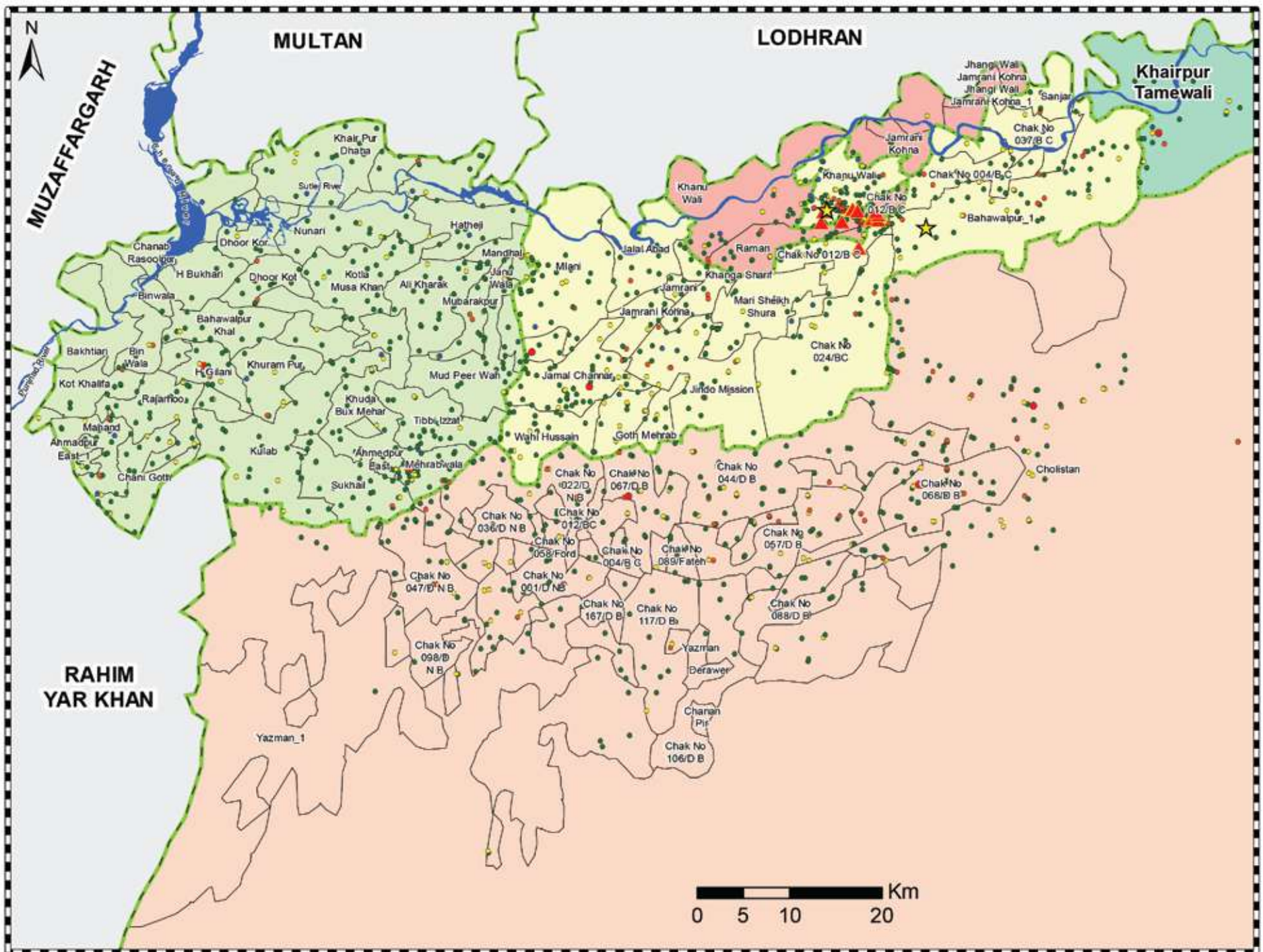
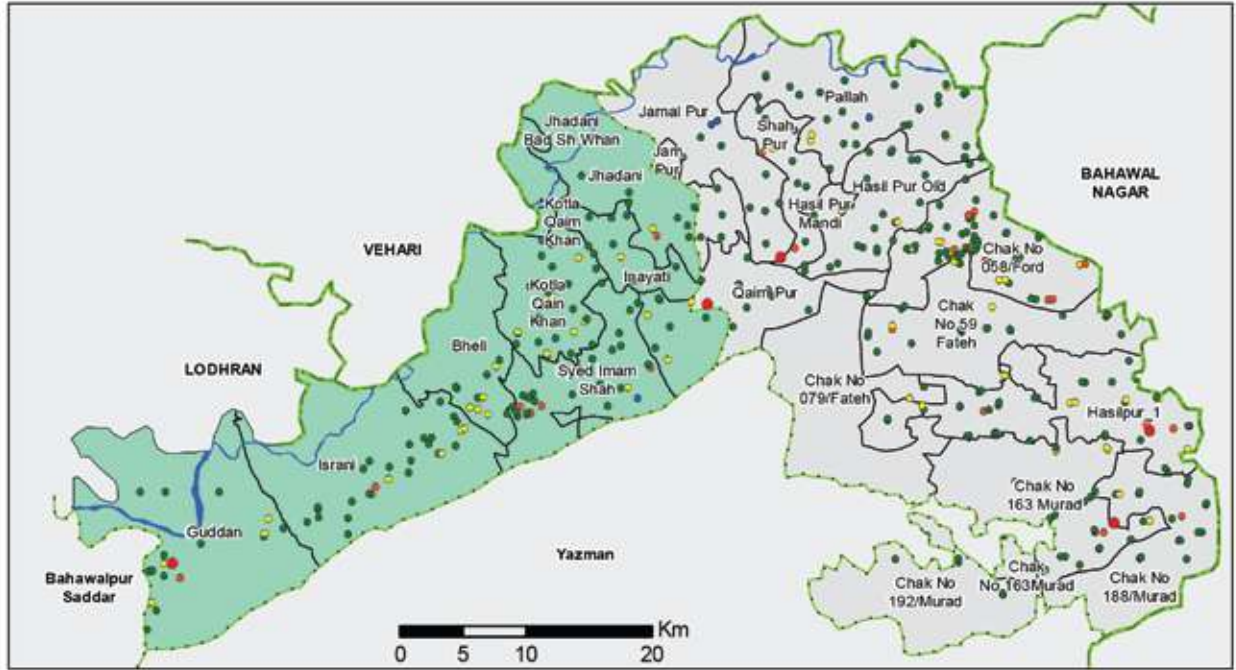
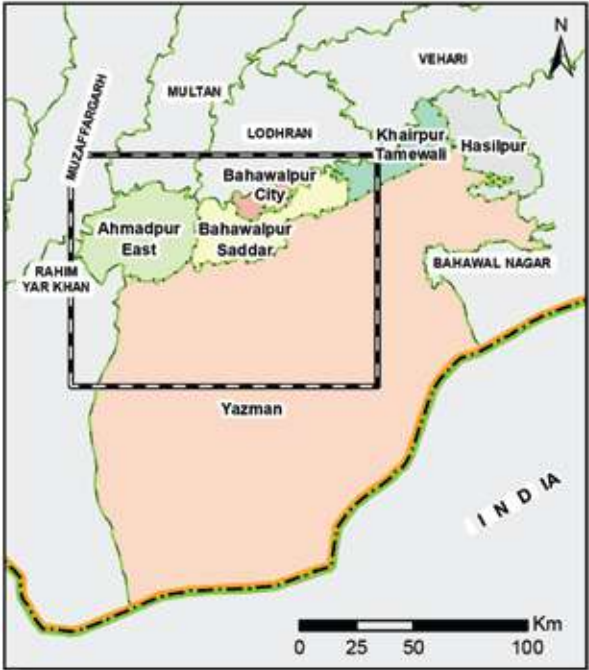
Tehsil Wise Building Conditions of Schools



Student to Teacher Ratio



EDUCATION FACILITIES MAP



Legend

- ★ University
- ▲ College
- Higher Secondary School
- High School
- Middle School
- Primary School
- Masjib/Maktab School
- Blue line River and Water Body
- ABC Union Council Boundary
- ABC District Boundary
- Green line Provincial Boundary
- Red line Line of Control
- Orange line International Boundary
- Tehsil Boundary**
- Light Green Ahmadpur East
- Light Red Bahawalpur City
- Light Yellow Bahawalpur Saddar
- Light Blue Hasilpur
- Light Green Khairpur Tamewali
- Light Orange Yazman

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan



MAP INFORMATION

Data Source(s):

School Education Department,
Government of the Punjab

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-014
Prepared by: Project Management Unit, NDMA
Last Updated: 2nd May, 2017

Irrigation System plays a role of great importance in the increase of crop yield. The fact remains that the processes involved in irrigation control moisture in the soil for the growth of seeds and better crop production.

District Bahawalpur is a fertile tract of alluvial clay. The main source of irrigation in the district is canals. Qasim Canal, Bahawal Canal Upper, Bahawal Canal Lower, Panjnad Canal and Abbasia Canal quench the thirst of Bahawalpur land. These canals are part of Bahawalpur irrigation zone, which covers a total area of 4.42 million acres, including the area of Bahawalpur district.

In the pre-irrigation period, ground-water flow in the Bahawalpur area was generally southward from the Sutlej River toward the desert areas. Since the introduction of intensive canal irrigation, water levels have been rising and the water table in much of Chaj and Rechna Doabs, in part of Bari Doab, and in the upstream areas of Thai Doab and Bahawalpur is now above the average level of the bordering streams and within 5 to 15 feet of the land surface. Thus, there is a component of ground-water flow toward the rivers.

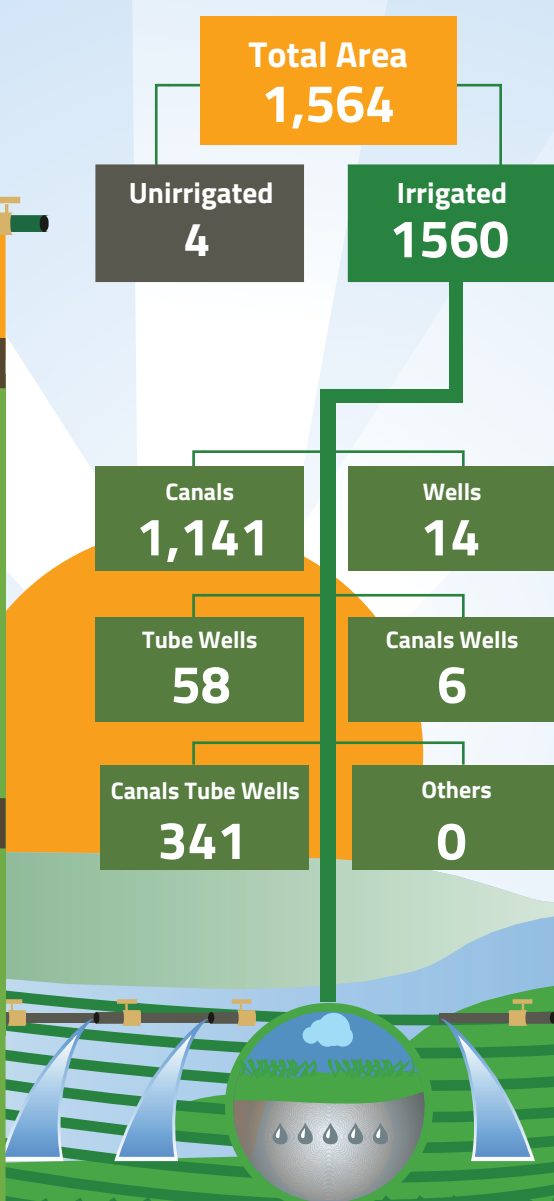
Canal System

| Name | Length (km) |
|-------------------------------|-------------|
| Major Canals | |
| Unknown | 2.3 |
| MAILSI CANAL Main Line | 4.8 |
| P njand Main Canal | 25.7 |
| Qaimpur Canal | 2.8 |
| Fordwah Canal | 3.7 |
| Desert Branch (Bahawal Canal) | 67.5 |
| Abbasia Canal | 28.5 |
| Ahmadpur Baranch | 8.6 |
| Bahawal Link Canal | 19.4 |
| Abbasia Canal | 1.8 |
| Minor Canals | |
| Rasul Minor | 0.2 |
| Fazl 1L Minor | 5.0 |
| Khair 1L Minor | 6.8 |
| Haqani Minor | 22.7 |
| Talb ni Minor | 14.1 |
| Mari 1L Minor | 11.6 |
| Samar Minor | 0.3 |
| Berwala Minor No 1 | 17.8 |
| 3R Minor | 15.1 |
| Berwala Minor No.2 | 0.6 |
| Sultan Minor | 16.9 |
| Disused | |
| 1R Minor (Disused) | 8.1 |
| Mithra disty (Disused) | 1.0 |
| 1R Minor (Disused) | 9.6 |
| Sub Minor (Disused) | 13.9 |
| Hakra Branch | 7.7 |
| Shahiwala Disty (Disused) | 23.0 |
| Derawar Branch(Disused) | 17.2 |
| Quraish 1L Minor (Disused) | 22.0 |
| D rawar Branch(Disused) | 5.3 |
| Dahri Disty (Disused) | 14.1 |
| 1L Minor (Disused) | 36.6 |
| Unknown | 10.2 |
| Distributaries | |
| Bahawalpur Disty | 34.0 |
| 3L Distributory | 14.1 |
| 1R Khabbanwala Disty | 6.9 |

Area Sown

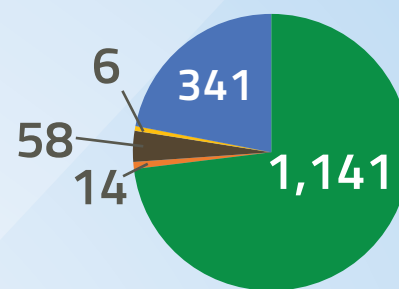
(Thousand Hectares)

Note: Excludes 485,000 hectares under orchards & 17,000 hectares under Tobacco, sown under "Zaid Rabi" Crop.



Area Sown by Different Irrigation Techniques

(Thousand Hectares)



- Wells
- Canals
- Canal-Wells
- Tubewells
- Others
- Canal Tubewells

Tube Wells Installed by Energy Source (2013-14)



| Name | Length (km) |
|---------------------------|-------------|
| Distributaries | |
| Hakra Righl Distributory | 25.9 |
| Saluwali Disty | 9.4 |
| U h Disty | 36.4 |
| Khan Wah 3L Disty | 2.6 |
| Bahawal Wah Disty | 12.3 |
| Pakka Wah 1L Disty | 10.6 |
| Qutb Wah Distributory | 36.1 |
| Mamun Disty | 25.7 |
| Nauranga 4L Disty | 12.1 |
| Panjnad River | 8.0 |
| R Mamunian Disty | 22.7 |
| 2L Distributory | 9.7 |
| Bhari Dist | 1.5 |
| Banwala Disty | 8.3 |
| Shahiwala Disty (Disused) | 5.9 |
| 2 R Distributory | 27.8 |
| Mirhra Disty | 4.4 |

| Name | Length (km) |
|-------------------------|-------------|
| Distributaries | |
| Dahri Disty | 19.5 |
| Derawar Disty | 22.1 |
| Sardar Wah 4L Disty | 10.2 |
| Bahawal Disty | 6.3 |
| Azim Disty | 12.4 |
| Qaimwah Disty | 2.6 |
| Fateh Disty | 5.3 |
| Bagh Ali Disty | 10.0 |
| Hari Disty | 5.1 |
| Murad Disty | 6.0 |
| Harunabad Disty | 8.7 |
| Others | |
| Sutlej River | 1.5 |
| River | 7.0 |
| Desert Branch Reservoir | 32.7 |
| 2R (Khabbarwalai) | 4.7 |
| Unknown | 10.0 |

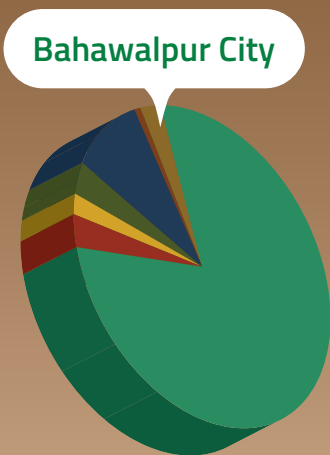
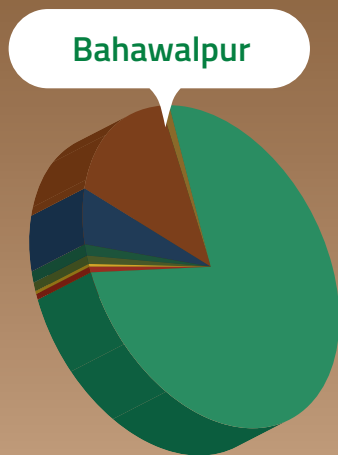
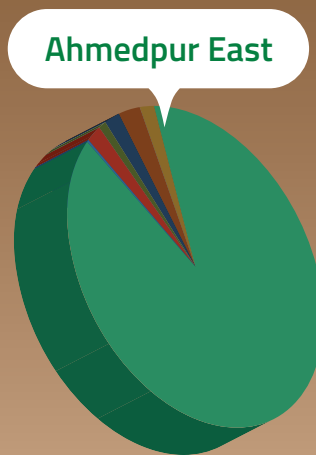
| Name | Length (m) |
|---------------------------|------------|
| Embankments | |
| Left Marginal Bund US | 20,111.3 |
| Right Marginal Bund | 9,672.0 |
| Left Retired Embankment | 1,071.0 |
| Colony Protection Bund | 4,274.5 |
| Colony Bund | 2,827.0 |
| Right Guide Bund DS | 157.7 |
| Ahmedpur Flood Bund | 50,999.3 |
| Left Marginal Bund | 19,727.1 |
| Minchin Flood Bund Khanpu | 14,397.3 |
| Right Marginal Bund US | 3,306.9 |

| Name | Length (km) |
|--------------------------|-------------|
| Embankments | |
| Right Protection Bund US | 152.6 |
| Right Guide Bund US | 1,089.1 |
| Left Guide Bund DS | 143.7 |
| Left Guide Bund US | 793.8 |
| Left Guide Bund | 1,078.8 |
| JHead Spur AT RD 16500 | 130.5 |
| Right Guided Bund | 1,123.9 |
| Sikrani Bund Khanpur | 5,776.5 |
| Second Defence Bahawapur | 10,142.1 |
| Untitled Path | 308.1 |

| Name | Length (m) |
|---------------------------|------------|
| Spur | |
| JHead Spur AT 6500 of LMB | 2,113.1 |
| JHead Spur AT RD 12750 | 1,858.7 |
| Mole Head Spur | 1,748.9 |
| Headworks | |
| Punjnad HeadWork | 1,037. |

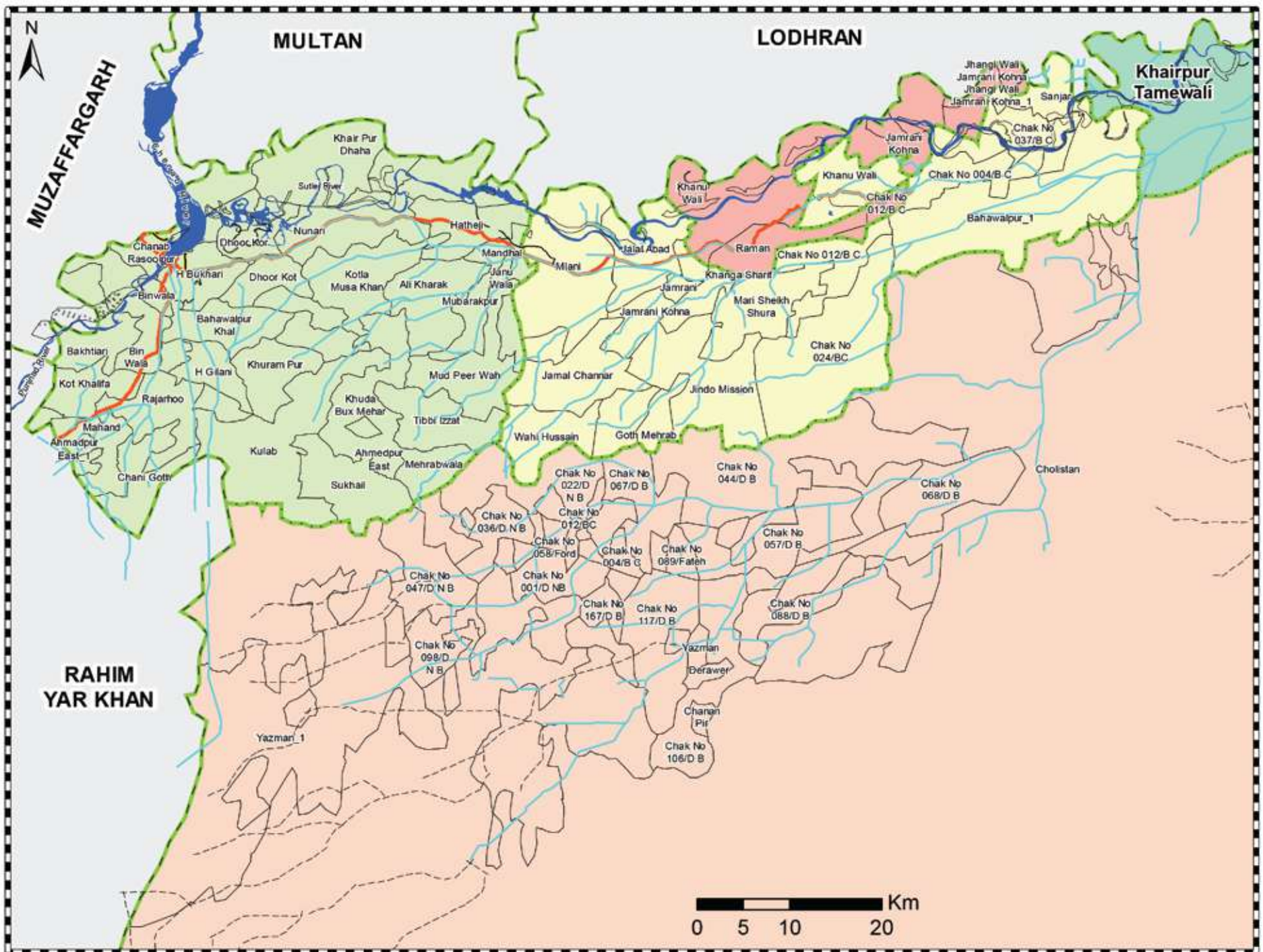
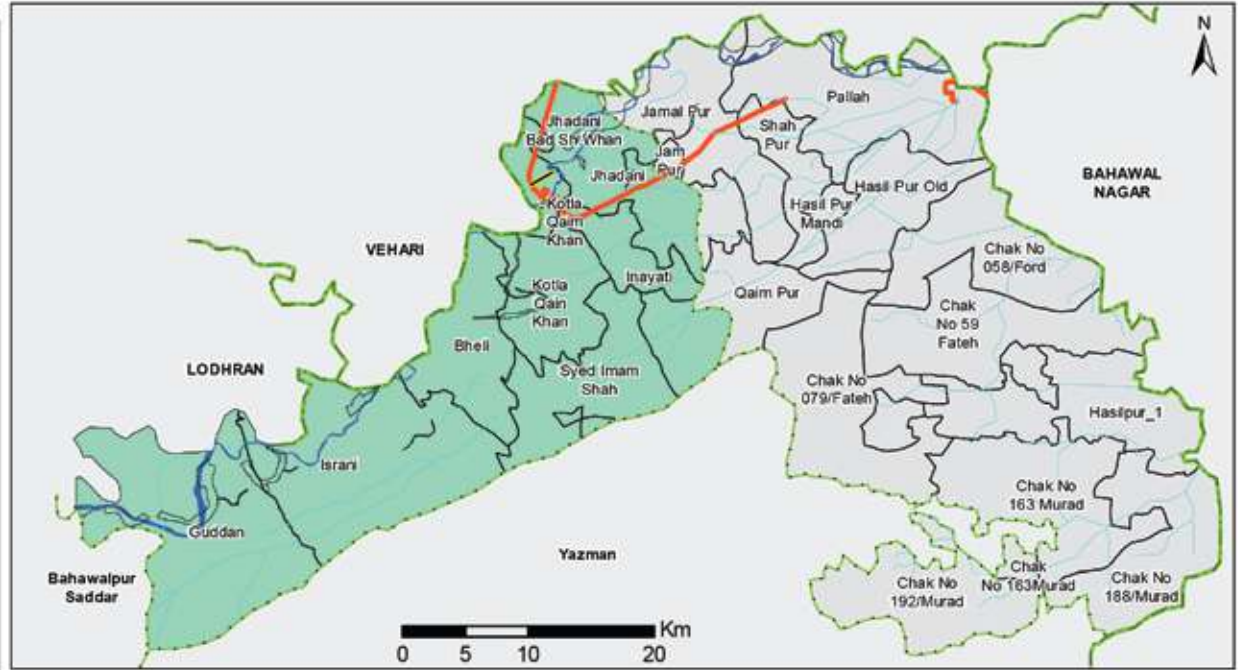
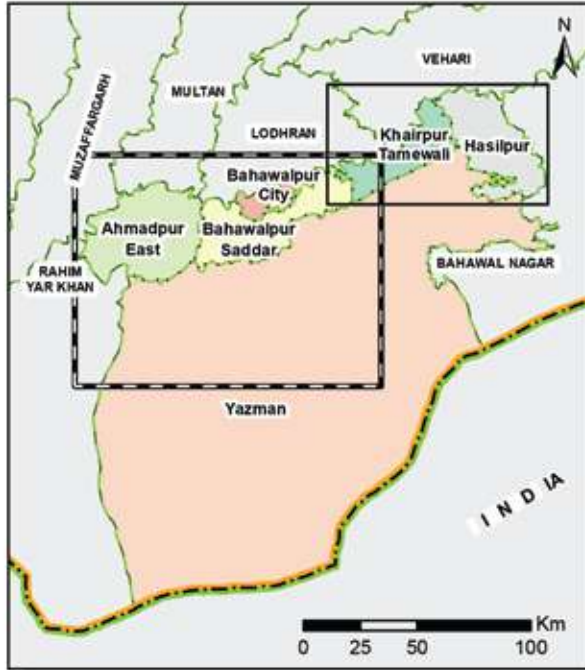


Tehsil Wise Land Use Classification



- Orchards
- Forest - Natural Trees and Mangroves
- Bare Areas with Sparse Natural Vegetation
- Crop Irrigated
- Natural Vegetation in Wet Areas
- Wet Areas
- Crop Marginal and Irrigated Saline
- Range Lands - Natural Shrubs and Herbs
- Snow and Glaciers
- Crop in Flood Plain
- Built-Up
- Bare Areas
- Crop Rainfed

IRRIGATION MAP



Legend

| | | |
|-------------------|------------------------|-------------------|
| Main Canal | River and Water Body | Bahawalpur Saddar |
| Disused | Union Council Boundary | Hasilpur |
| Gradually Sand | District Boundary | Khairpur Tamewali |
| Outer Limit | Provincial Boundary | Yazman |
| Embankments | Line of Control | |
| Spur | International Boundary | |
| Dikes/Studs | Tehsil Boundary | |
| Dams & Reservoirs | Ahmadpur East | |
| Headworks | Bahawalpur City | |
| Pondage/Ditch | | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION
 Data Source(s): Irrigation Department, Punjab Survey of Pakistan SUPARCO
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-015
 Prepared by: Project Management Unit, NDMA
 Last Updated: 20th April, 2017

The main industries of the district are textile, cotton ginning and pressing, sugar, cottonseed oil, edible oil, soap, beverage making, agricultural implements manufacturing and fertilizer, manufacturing. Cottage industry includes ginning, pottery/clay products, electric desert cooler, agricultural machinery, handicrafts, food industry, and embroidery. In

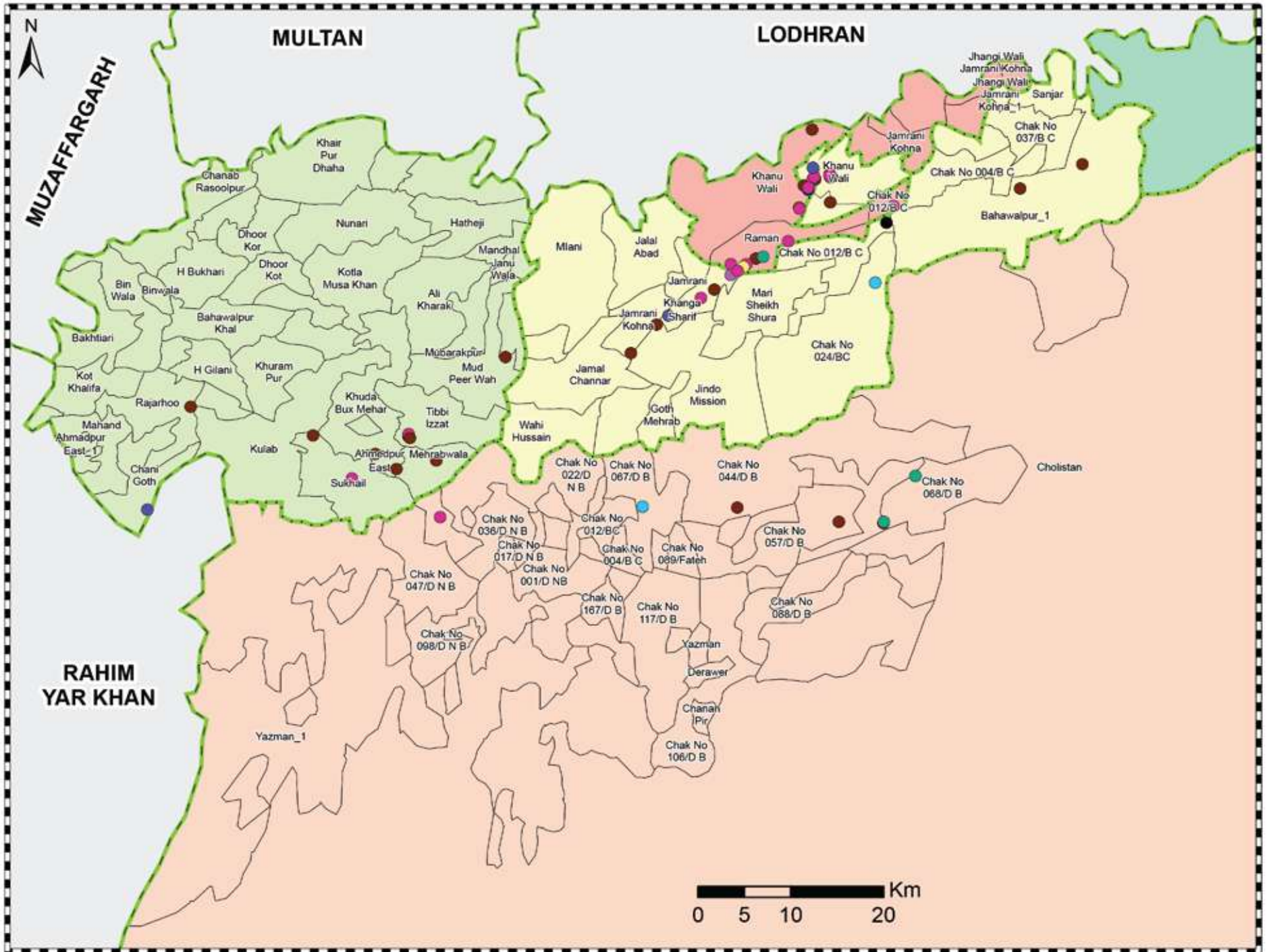
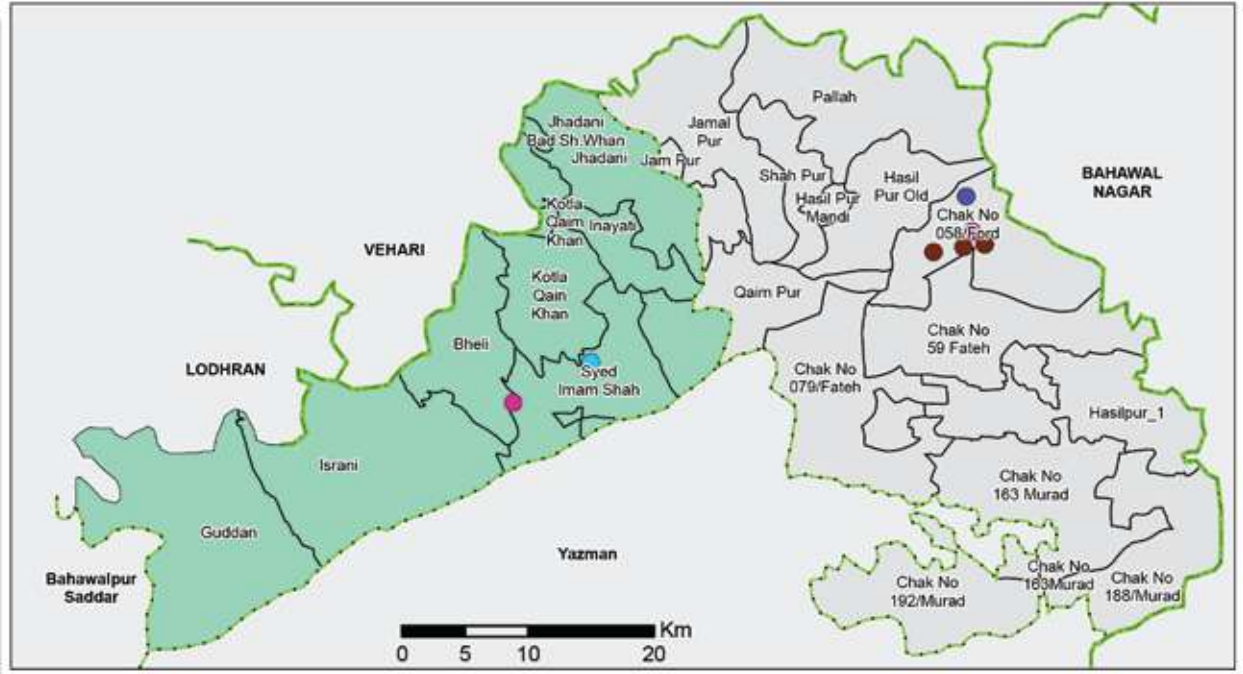
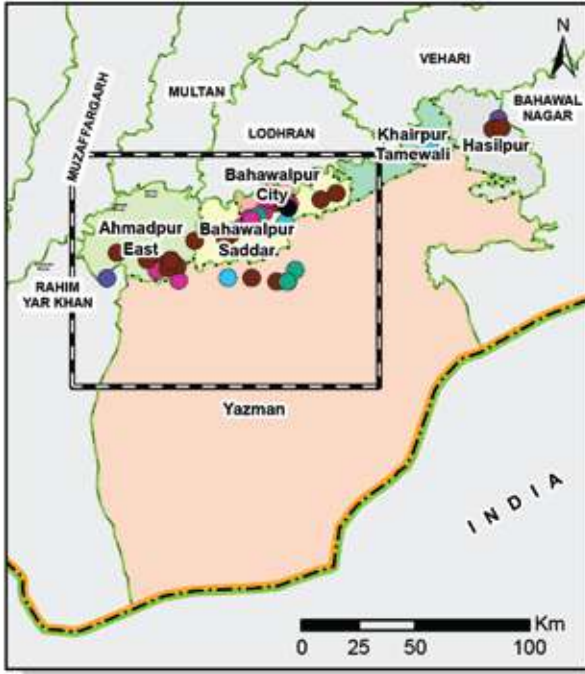
view of the existing industries, there exists good potential for sizing plant, good quality packing boxes, paper and paper board, high density polypropylene woven bags, paper cones and bobbins, tins for vegetable ghee / cooking oil packing, hosiery, towels, etc.

Number of Registered Factories & Employment Level (As on 30th June 2014)



| Industry | No. of units | Installed Capacity |
|---------------------------|--------------|---------------------------------------|
| Agricultural Implements | 1 | 12,000 Nos. |
| Cold Storage | 16 | 109,000 Bags/Crates |
| Cotton Ginning & Pressing | 154 | 780 Sawgins, 162 Press, 359 Expellers |
| Flour Mills | 39 | 6,280 M.Tons/Day |
| Iron & Steel Re-Rolling | 1 | 4,800 M.Tons |
| Paper & Paper Board | 1 | 2,500 M.Tons |
| Poultry Feeds | 3 | 4,700 M.Tons |
| Rice Mills | 6 | 16 Hullers |
| Solvent Oil Extraction | 3 | 85,000 M.Tons |
| Sugar | 1 | 8,000 Tcd |
| Motorcycle/Rickshaw | 1 | 10,000 Nos. |
| Textile Spinning | 6 | 99,172 Spindles, 200 Rotors |
| Textile Weaving | 4 | 438 Looms |
| Ghee/Cooking Oil | 4 | 118,500 M.Tons |

INDUSTRIES MAP



Legend

- Marble Factory
- Cotton Factory
- Oil Industry
- Ice Factory
- Flour Mill
- Wool Factory
- Sugar Mill
- Agro Chemical Industry
- Ghee Industry
- Bahawalpur Chamber Of Commerce & Industry
- Textile Mill
- Cold Storage

Union Council Boundary (abc)

Tehsil Boundary

- Ahmadpur East
- Bahawalpur City
- Bahawalpur Saddar
- Hasilpur
- Khairpur Tamewali
- Yazman

ABC District Boundary

- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

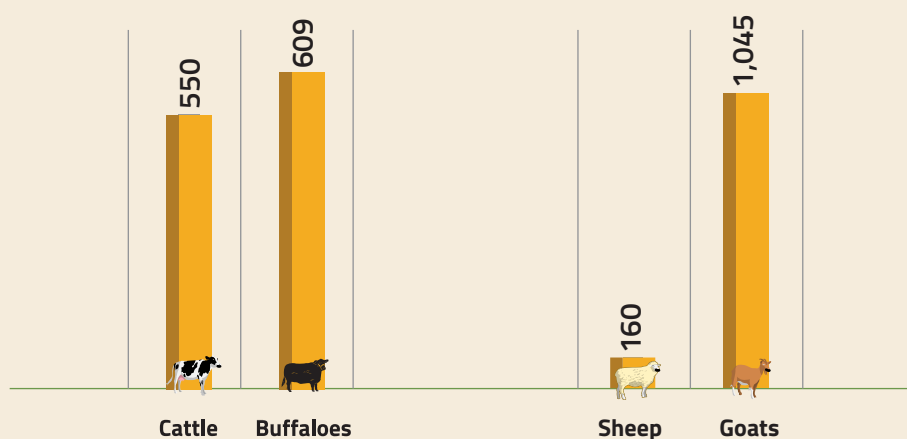
Data Source(s):
Punjab Agricultural Board, Government of Punjab
Survey of Pakistan
Pakistan Bureau of Statistics

Datum: WGS 1984
Units: Degree

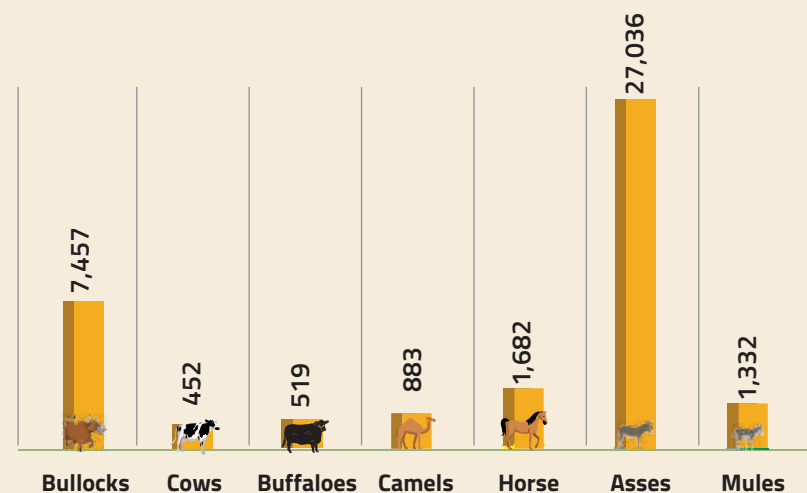
Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-016
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

16 LIVESTOCK

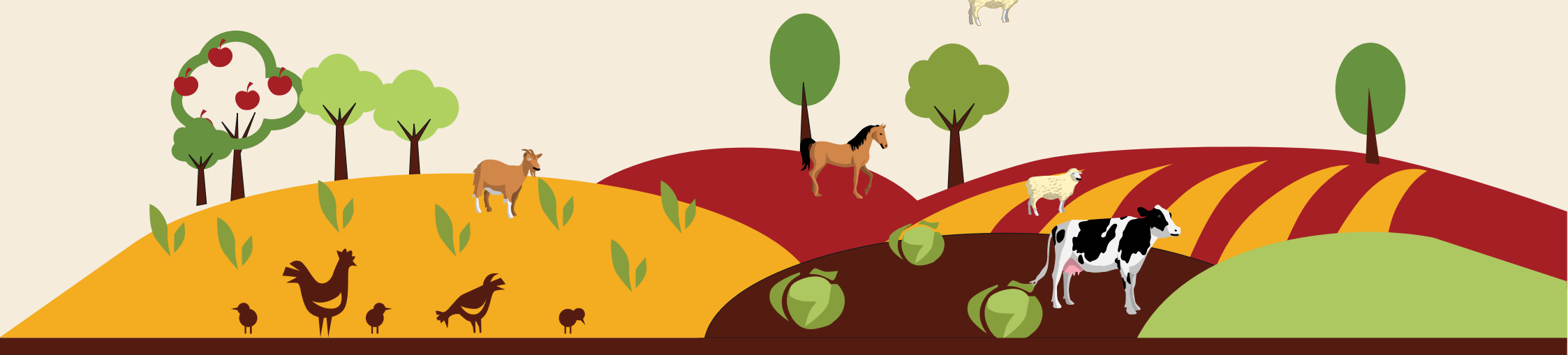
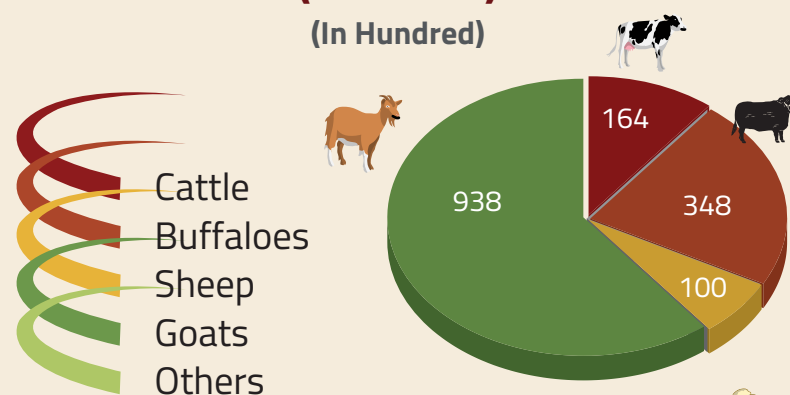
Number of Domestic Animals (2006)
(Thousand)



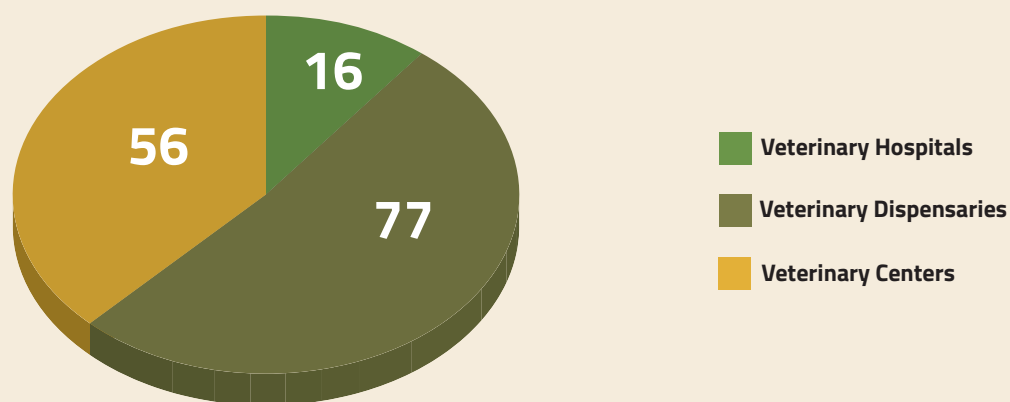
Number of Work Animals by Type (2006)
(Number)



Animals Slaughtered in Recognized & Unrecognized Slaughter Houses by Type (2013-14)
(In Hundred)

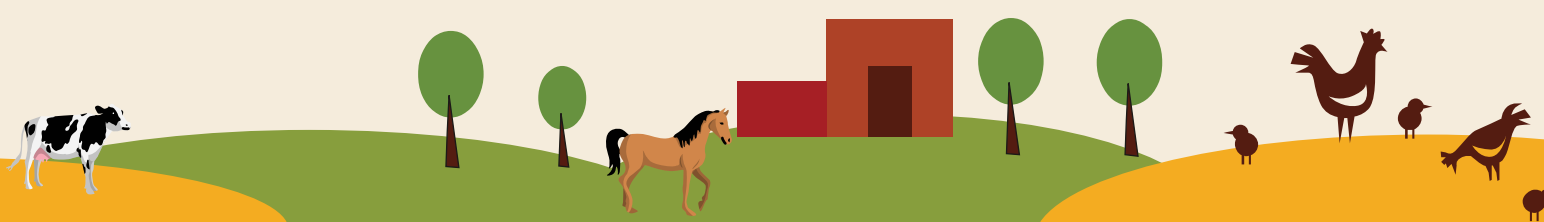


Veterinary Healthcare Facilities (2013-14)



Established Private Poultry Farms (2013-14)

| | Broiler Farms | Layer Farms | Breeding Farms |
|---|---------------|-------------|----------------|
| Number | 496 | 34 | 0 |
| Capacity to Rear Birds per Annum (Thousand) | 19020 | 340 | 0 |



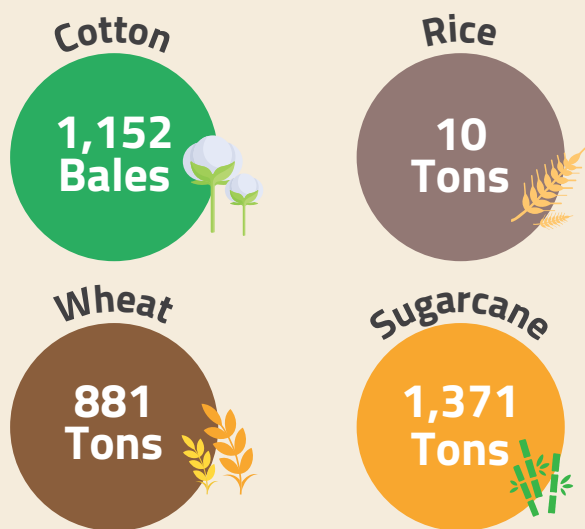
The district is endowed with variety of fruits, crops, vegetables and other resources. Mangoes, Citrus, Dates and Guava. Besides pomegranate, Jaman and Phalsa are major fruits grown in minor quantities in the district. Cotton, Wheat, Sugarcane, Rape/Mustard Seeds. Besides Rice, Gram, Tobacco, Jawar, Baja, Moong, Mash, Masoor, Maize are major crops grown in the district. Onion, Tomato, Potatoes, Brinjal, Carrot, Cauliflower,

Bottle Gourd are main vegetables. Besides Ladyfinger, Turnip, Matter Green, Garlic and Chilies are also grown in minor quantities in the district

A deeper look at the agricultural setup, livelihood and the allied processes/ means of Bahawalpur district are illustrated in the tables below:-

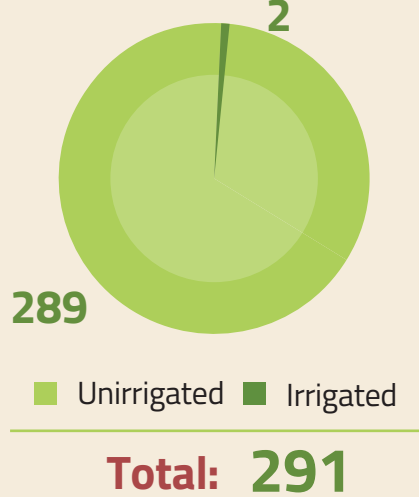
Major Crop Production

(2013-14)



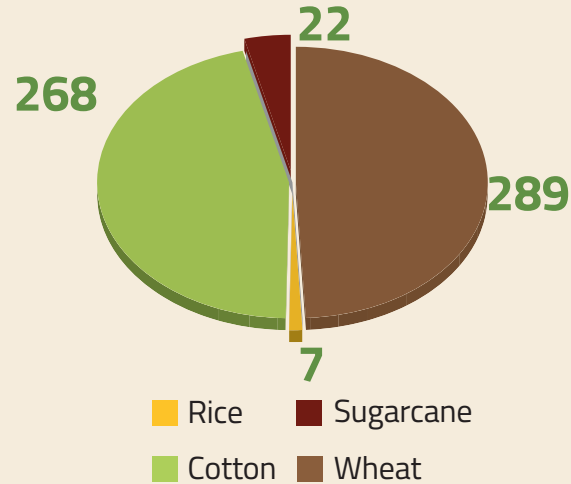
Total Area Sown

(Thousand Hectares)

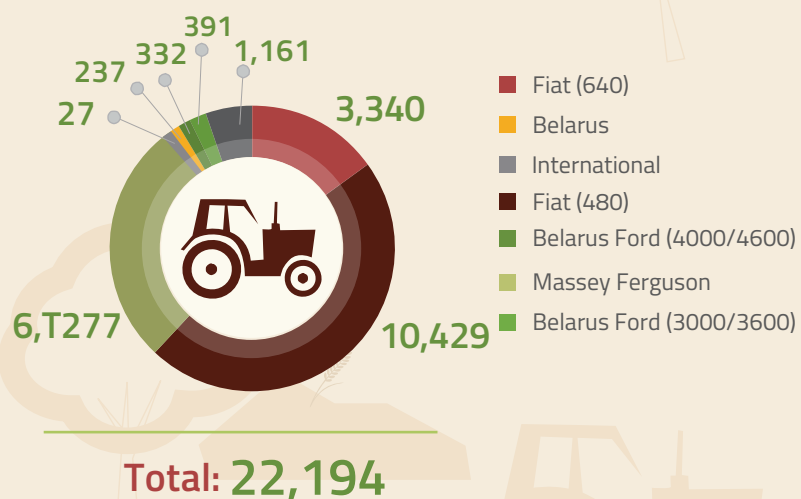


Area Sown Under Major Crops

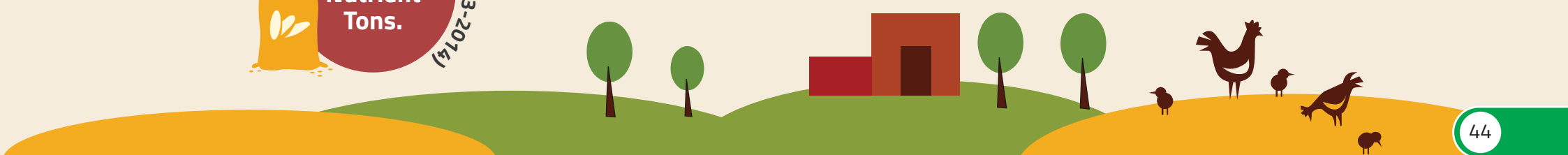
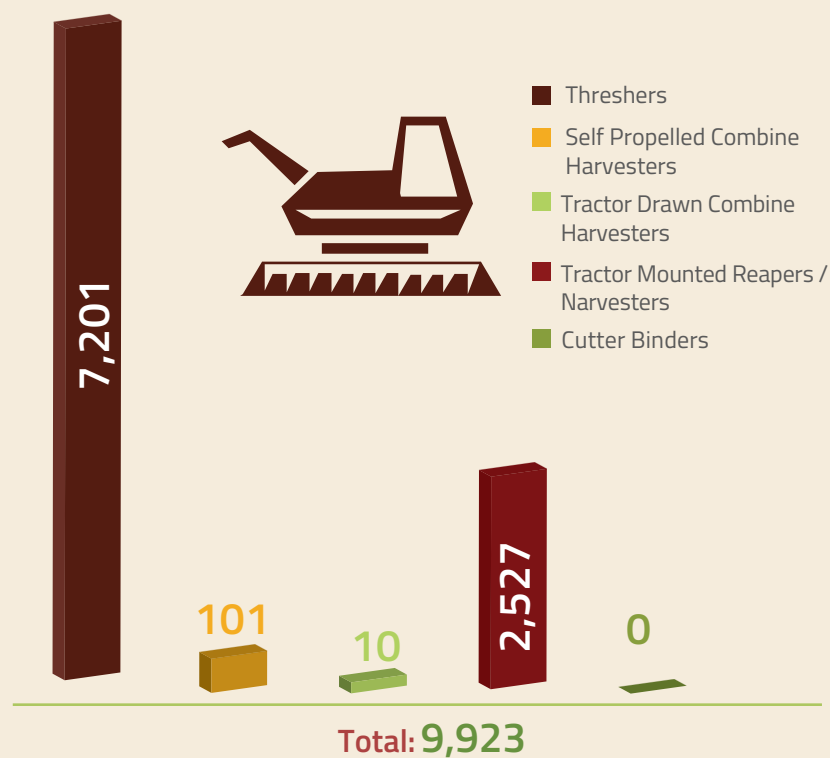
(Thousand Hectares)



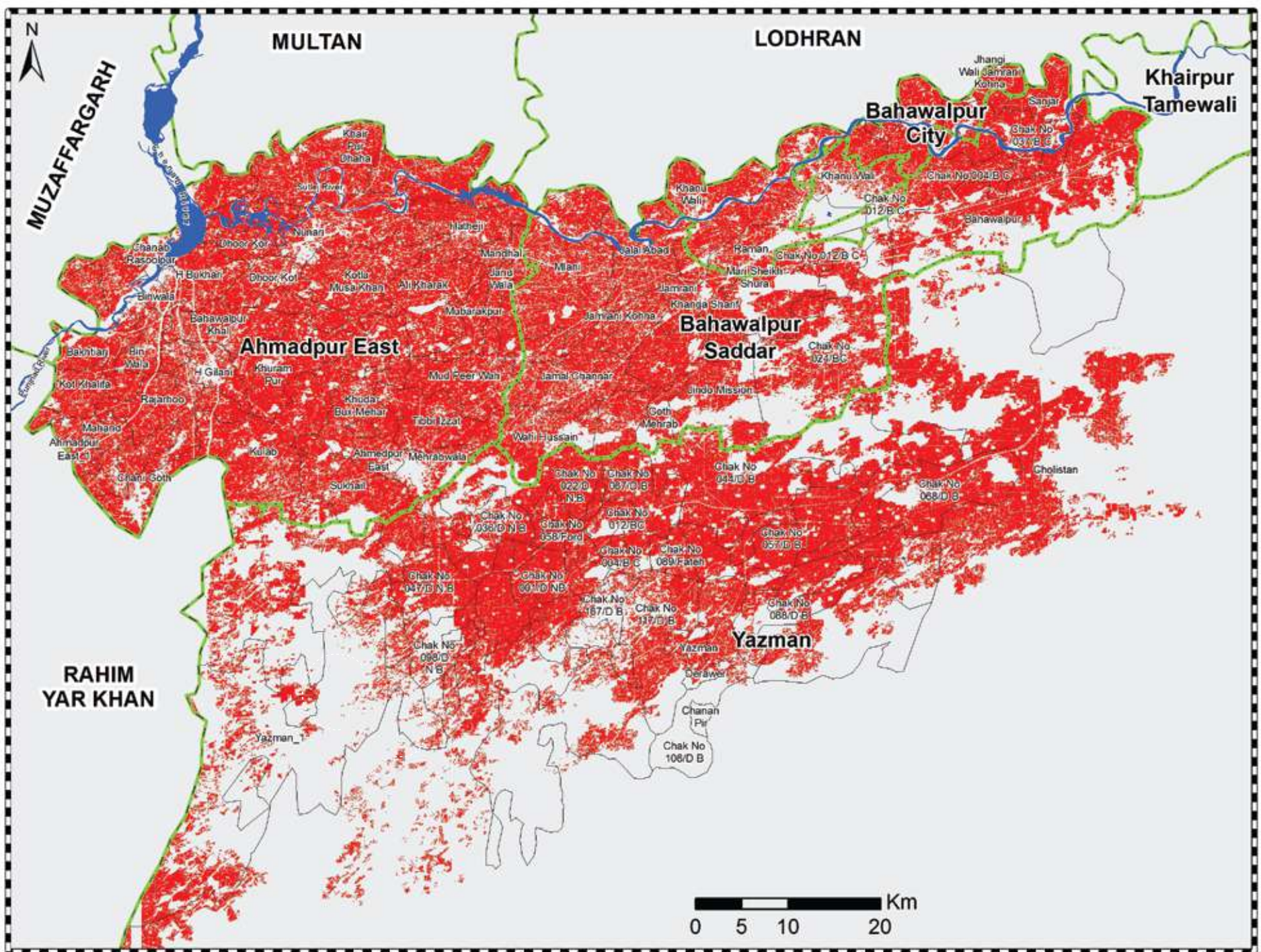
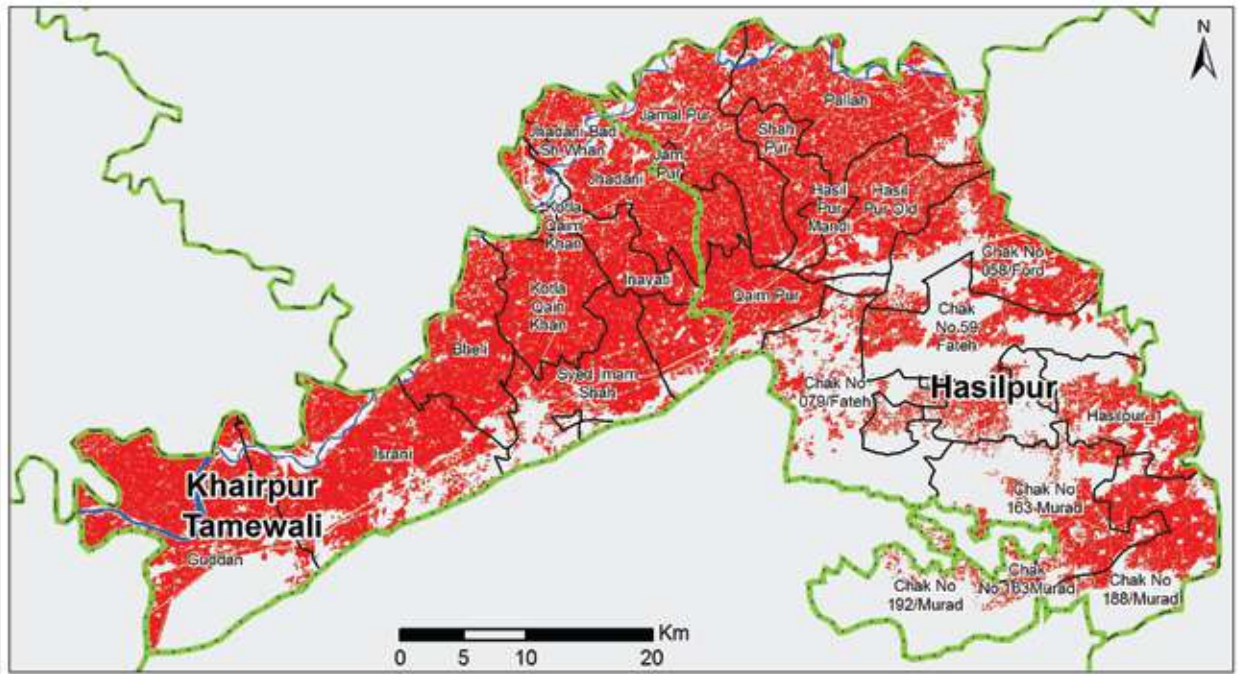
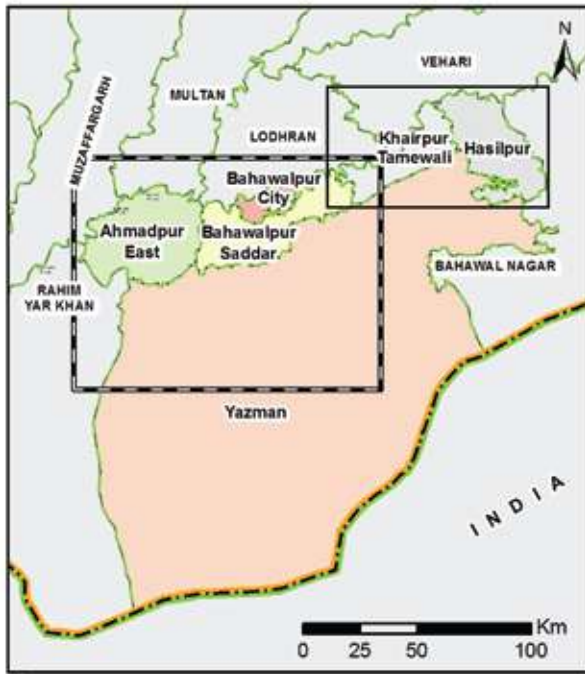
Tractors by Make (2012-13)



Threshers & Harvesters (2012-13)



RABI CROP MAP (JUNE TO FEB)



Legend

- Wheat
- River and Water Body
- Union Council Boundary
- Tehsil Boundary
- District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

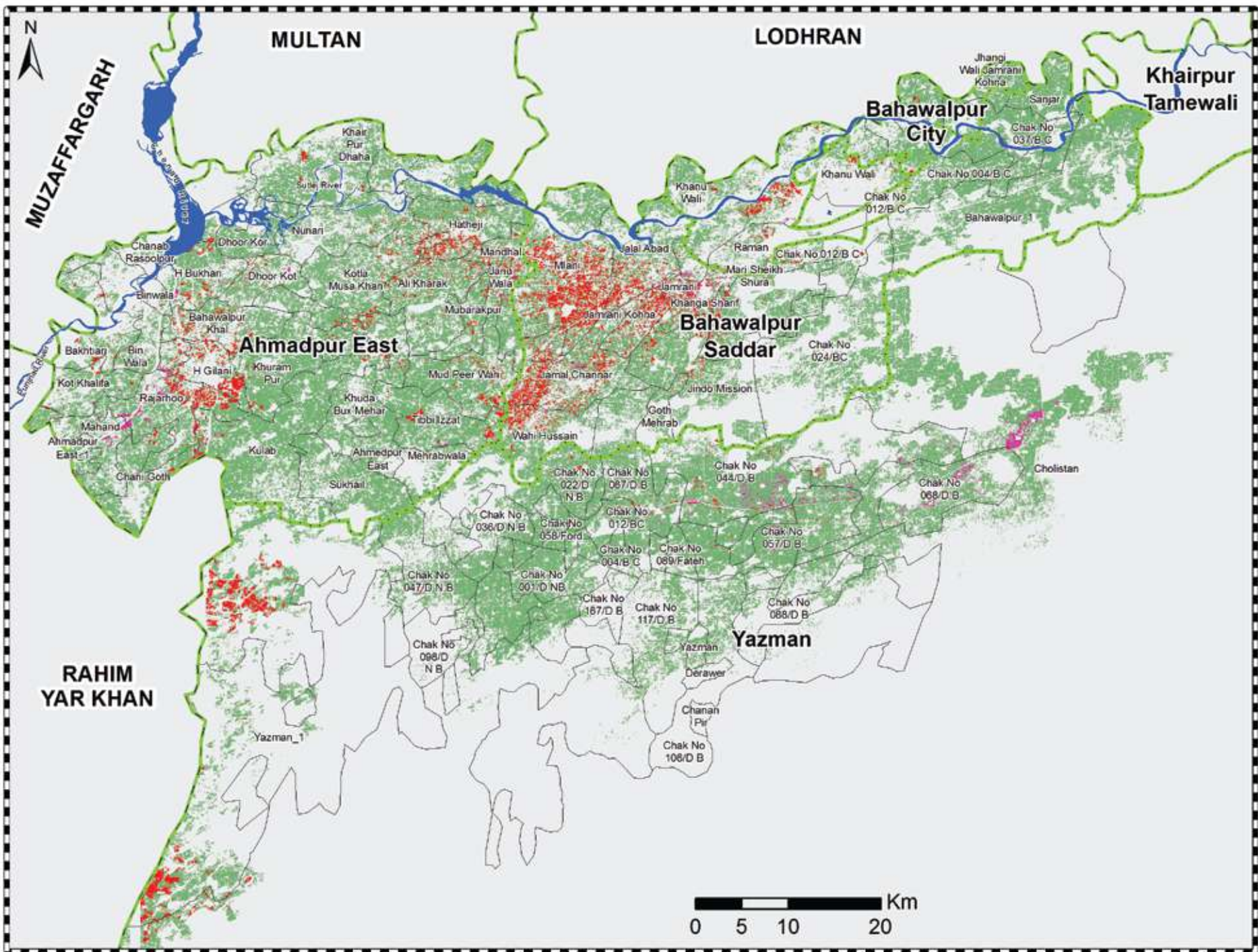
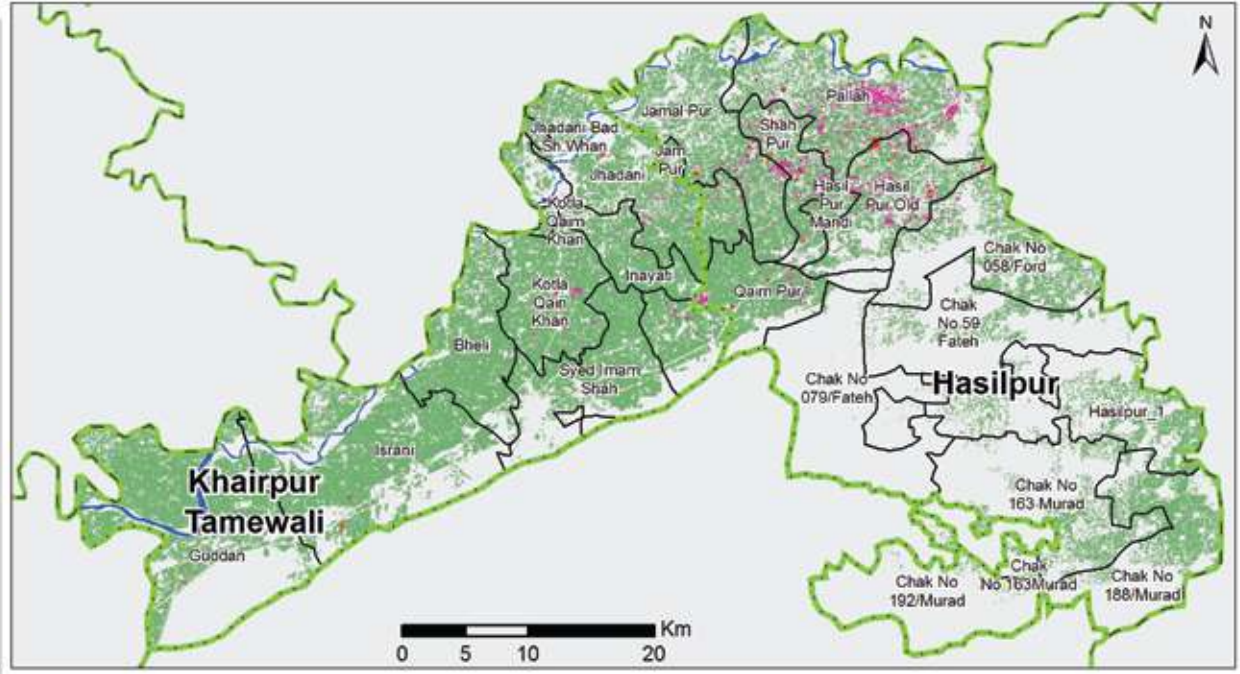
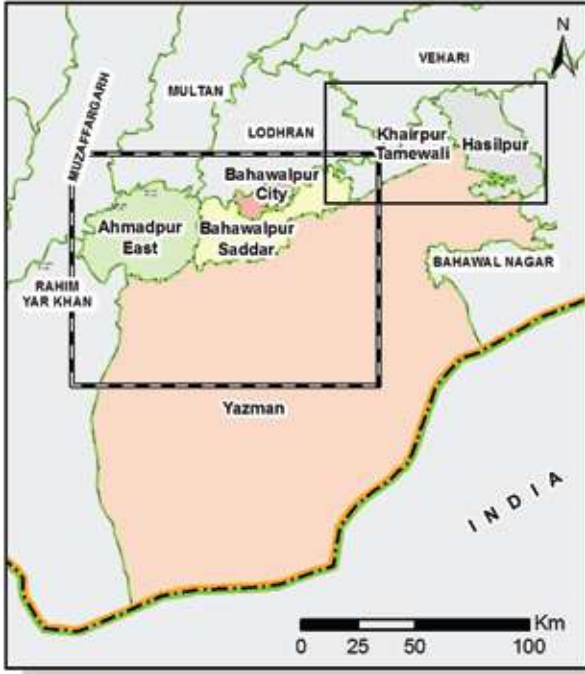
MAP INFORMATION

Data Source(s):
PBS, Govt. of Punjab, Govt. of Pakistan
Hazard Layer-NDMA, Crop Mask-SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-RB-012
Prepared by: Project Management Unit, NDMA
Last Updated: 22th June, 2017

KHARIF CROP MAP (AUG TO SEP)



Legend

| | |
|---|--|
| Rice | River and Water Body |
| Sugarcane | Union Council Boundary |
| Cotton | Tehsil Boundary |
| | District Boundary |
| | Provincial Boundary |
| | Line of Control |
| | International Boundary |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

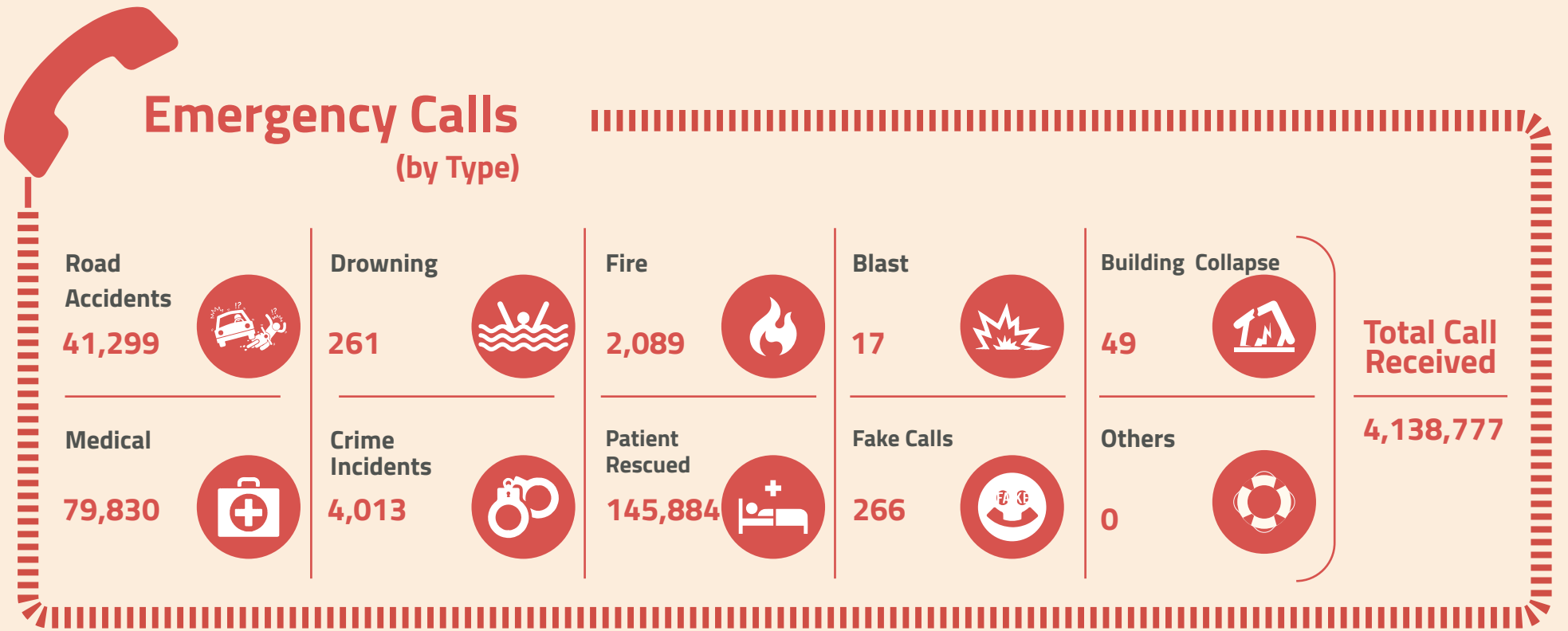
MAP INFORMATION

Data Source(s):
PBS, Govt. of Punjab, Govt. of Pakistan
Hazard Layer-NDMA, Crop Mask-SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-FEB-2016-GEN-NDMA-KH-012
Prepared by: Project Management Unit, NDMA
Last Updated: 22th June, 2017

Emergency Calls (by Type)



Rescue Equipment

| | | | | | | | |
|----------------|---|------------------|---|----------------------------|----|--------------------|---|
| Fire Vehicle | 5 | Water Bowser | 1 | Ambulance | 11 | Truck 05 Ton | 0 |
| Rescue Vehicle | 2 | Recovery Vehicle | 1 | Ground Duty Vehicles (GDV) | 1 | Foam Vehicle | 0 |
| Water R.Van | 0 | Aerial Platform | 0 | Ladder | 0 | Boat Carrier Truck | 0 |

Flood Resources

| | | | | | | | |
|-----------------------|----|------------|---|-------------|---|--------------|---|
| Boat | 6 | Scuba | 0 | Life Ring | 6 | Oars | 6 |
| On Board Motors (Obm) | 7 | Torch | 0 | Tents | 1 | Mosquito Net | 0 |
| Life Jacket | 32 | Life Guard | 8 | Plastic Mat | 0 | Dry Suit | 3 |
| | | Nylon Rope | 5 | Carpet | 0 | | |

Human Resource
245
Persons

Address

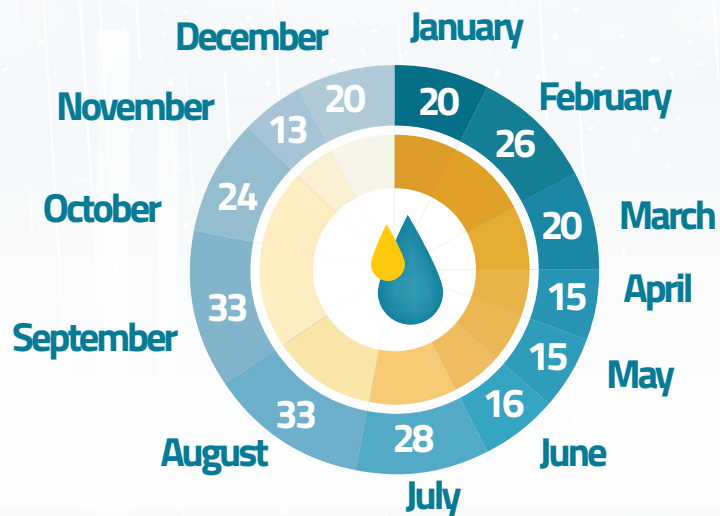
Rescue station, Airport Road, Bahawalpur

Longitude : 71.69 **Latitude :** 29.39

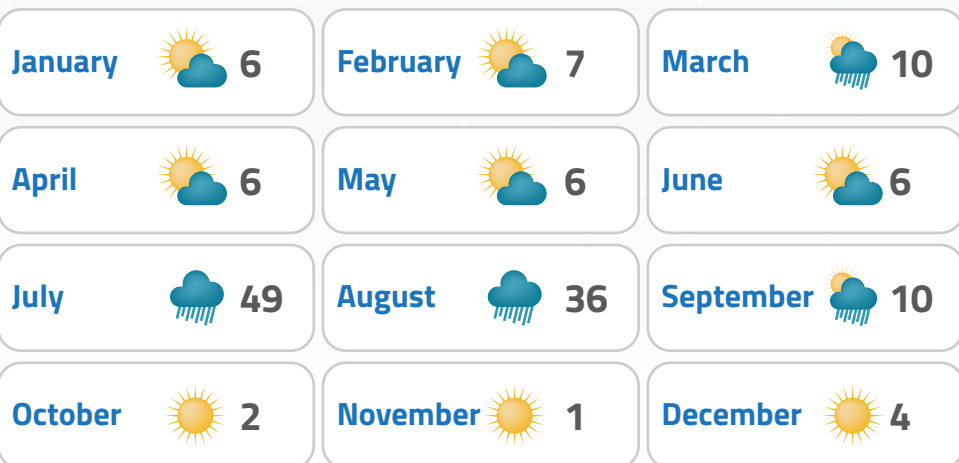


Bahawalpur District has a very hot and dry climate in summer while very cold and dry in winter. The maximum temperature reaches to 48°C while minimum temperature falls to 7°C. Wind and dust storms are frequent in summer. The average annual rainfall in the district is 180mm.

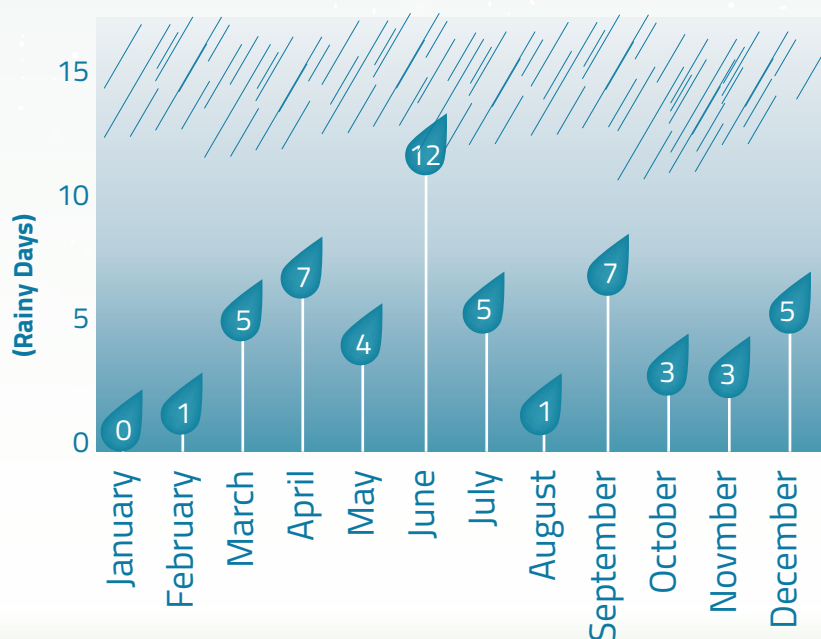
Relative Humidity (%)



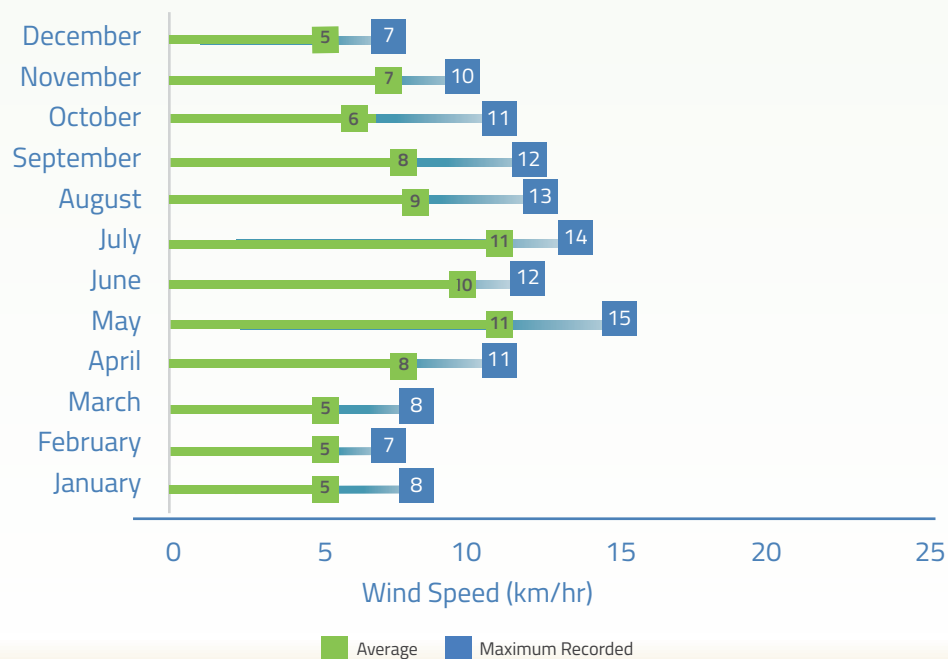
Average Precipitation (mm)



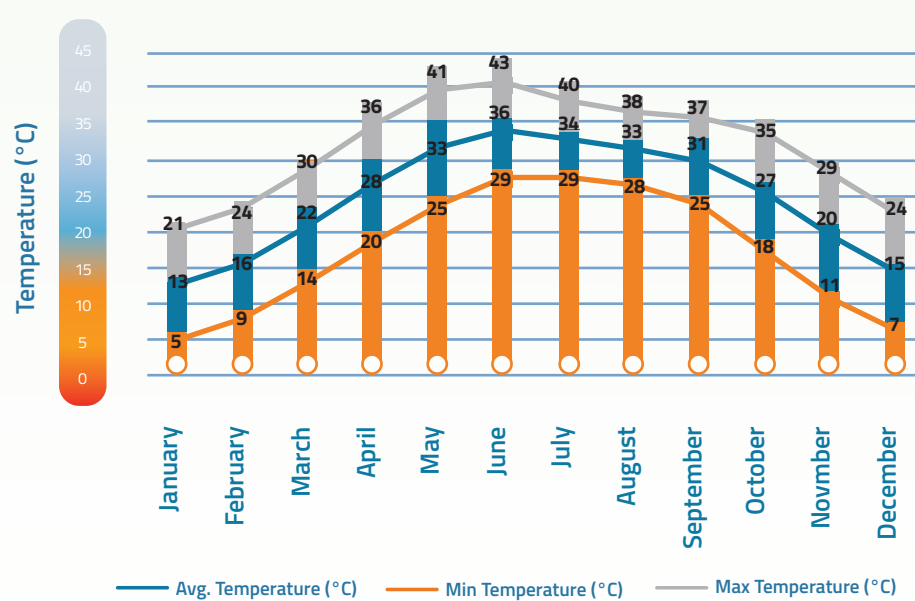
Average Rain Day (per month)



Average Wind Speed (km/hr)



Monthly Average Temperature (°C)





B

HAZARD ASSESSMENT

- DROUGHT
- EARTHQUAKE
- FLOOD



2 DROUGHT HAZARD ASSESSMENT

A large part of Pakistan faces severe effects of drought for most part of the year. Long-drawn-out presence of drought is a significant challenge to agriculture, human lives, livestock, forests, water resource management, urban planning and food security. Due to changing climatic patterns, the drought phenomenon is likely to increase in terms of recurrence, extent, and intensity, for which drought hazard assessment can provide scientific basis for planning interventions for DRR and land use planning. In this study following indices are used for assessment of drought hazard for District Multan to a Union Council level.

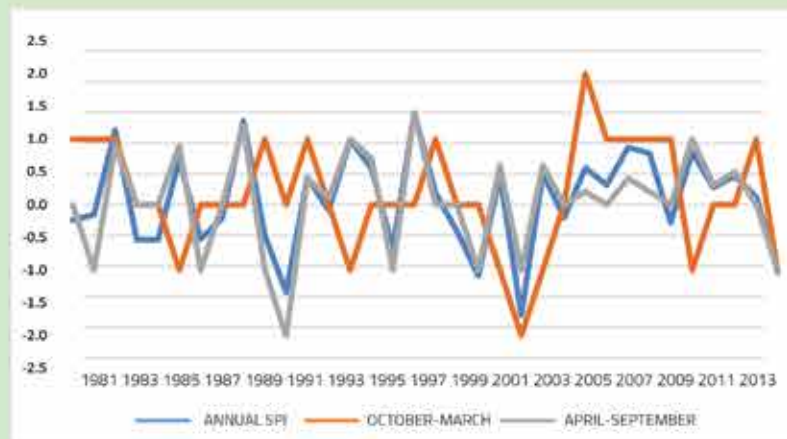
- a. Standard Precipitation Index (SPI)
- b. Normalized Difference Vegetation Index (NDVI)
- c. Drought Severity Index (DSI)
- d. Temperature Condition Index (TCI)
- e. Vegetation Condition Index (VCI)
- f. Vegetation Health Index (VHI)

Drought return period

A return period is the recurrence interval of a drought. It is statistical measurements, particularly based on previous data. Strategic planning and management of water resources under climate change and drought conditions often require the assessment of return periods of drought events categorized by high severities. Based on above mentioned 12-SPI, drought return period of 1951-2015 for district Multan is mentioned below.

| Drought Occurrence (Years) | Most Severe Drought |
|--|---------------------|
| 1984, 1985, 1987, 1988, 1991, 1998, 2000, 2002, 2003, 2009 | 2000 |

Standard Precipitation Index (SPI) 1981-2014

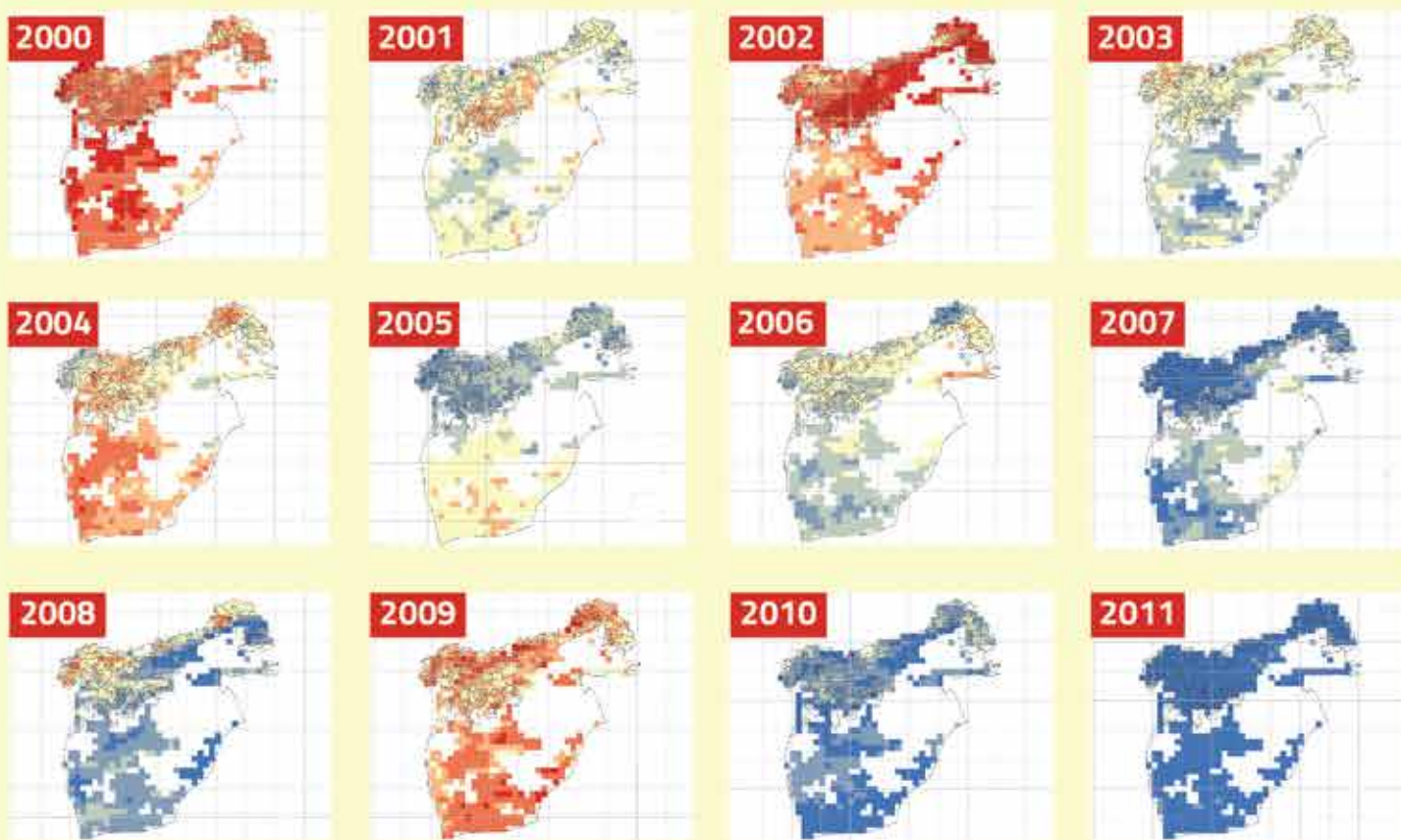


| SPI Value | Conditions |
|---------------|----------------|
| 2.0+ | Extremely Wet |
| 1.5 to 1.99 | Very Wet |
| 1.0 to 1.49 | Moderately Wet |
| -0.99 to 0.99 | Near Normal |
| -1.0 to -1.49 | Moderately Dry |
| -1.5 to -1.99 | Severely Dry |
| -2.0 and less | Extremely Dry |

Description:

SPI is a tool to determine the severity of a drought at a given time scale (temporal resolution) of interest for any rainfall station with historic data (record of at least 30 years). Mathematically, the SPI is based on the cumulative probability of a given rainfall event occurring at a station.

Drought Severity Index (DSI) 2000-2011



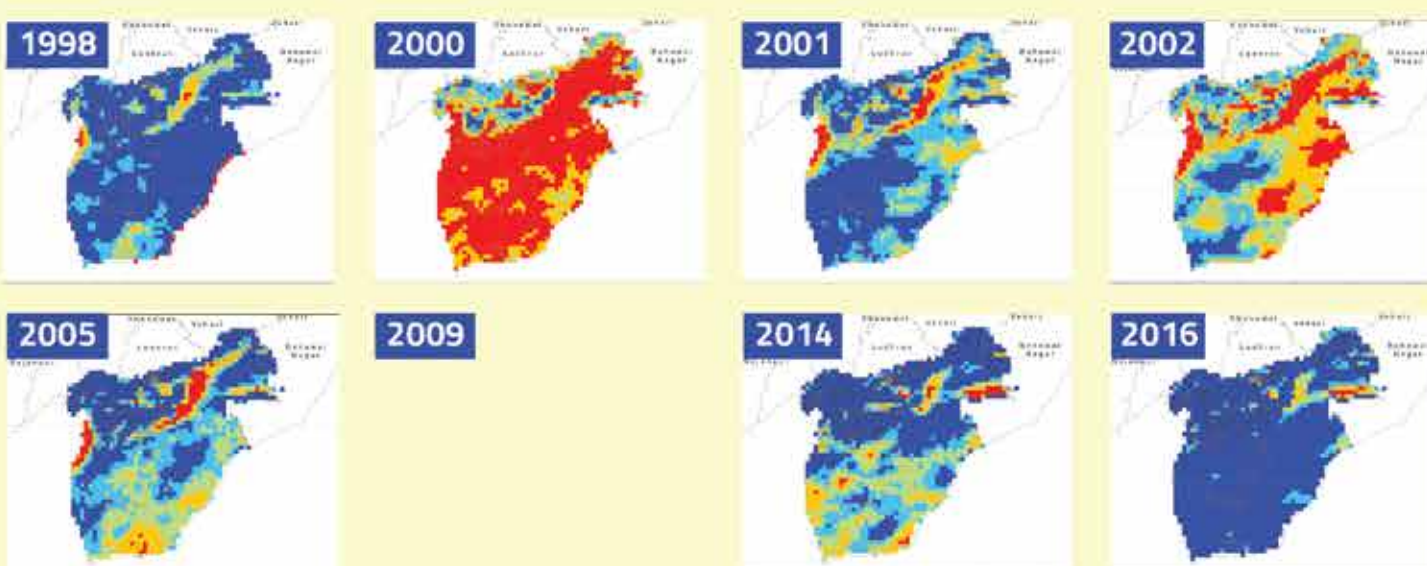
Legend:

- -1.5
- -0.5
- 0.5
- 1.5
- -1
- 0
- 1

Description:

DSI is an effective tool to estimate relative dryness of the land through using available temperature and precipitation data. It spans between the scales of -10 (dry) to +10 (wet).

Vegetation Condition Index (VCI) 1998-2016



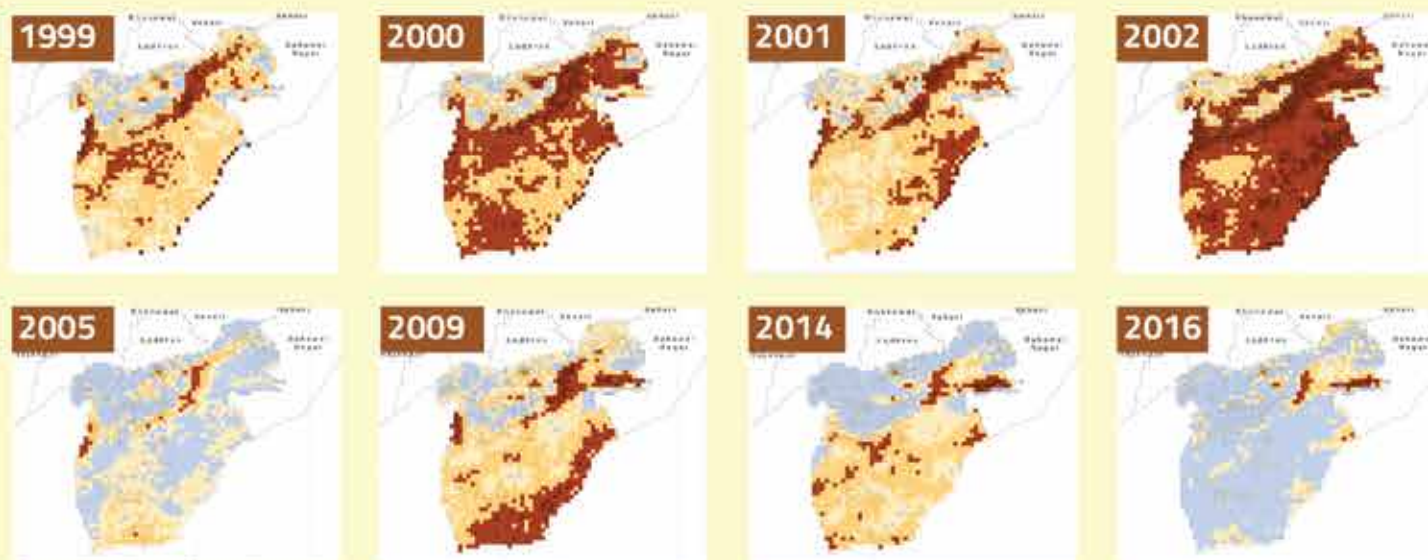
Legend:

- <10 (Extreme Drought)
- <20 (Severe Drought)
- <30 (Moderate Drought)
- <10 (Mild Drought)
- <10 (No Drought)

Description:

VCI is used to identify drought situations and determine the onset, especially in areas where drought episodes are localized and ill defined.

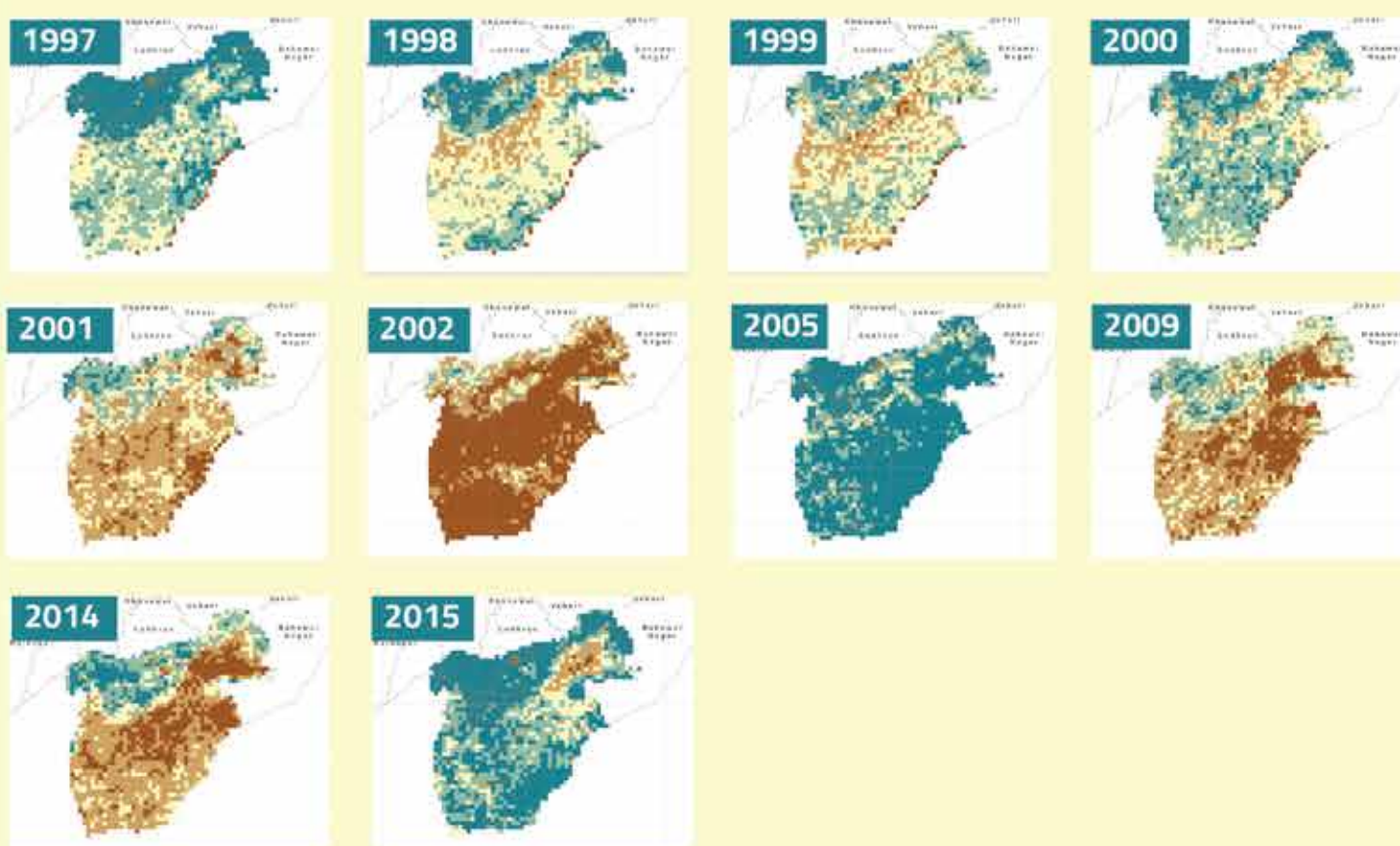
Vegetation Health Index (VHI) 1999-2016



- Legend:**
- <10 (Extreme Drought)
 - <20 (Severe Drought)
 - <30 (Moderate Drought)
 - <10 (Mild Drought)
 - <10 (No Drought)

Description:
VHI is used to identify and classify stress to vegetation due to drought.

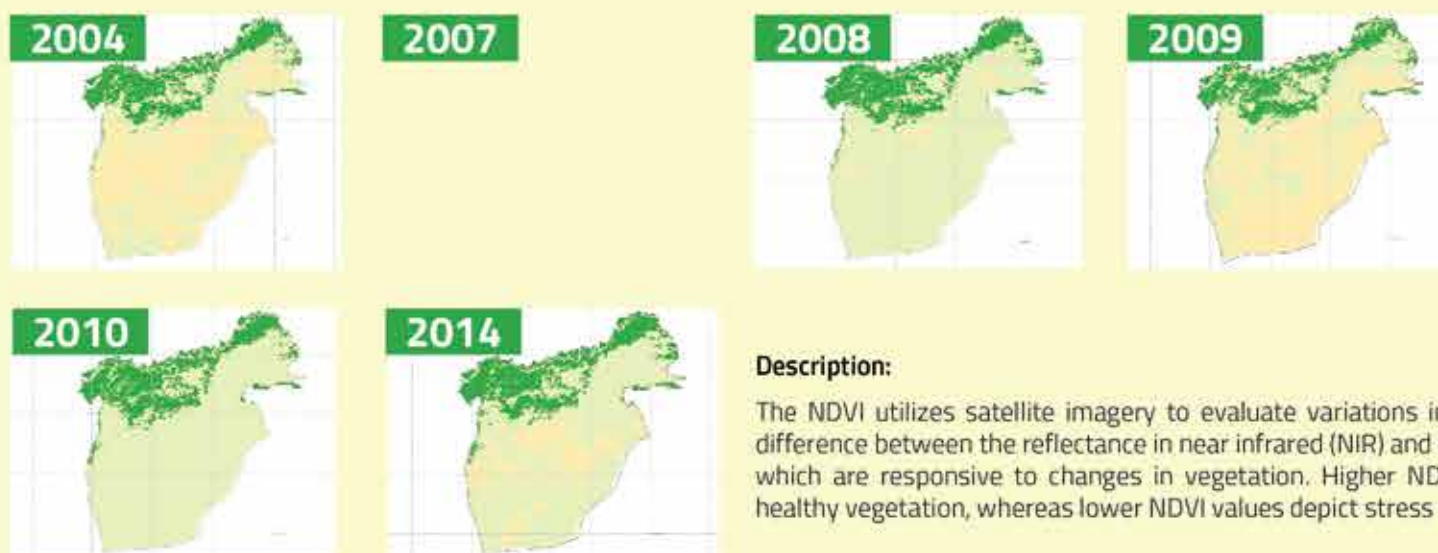
Temperature Condition Index (TCI) 1997-2016



- Legend:**
- <10 (Extreme Drought)
 - <20 (Severe Drought)
 - <30 (Moderate Drought)
 - <10 (Mild Drought)
 - <10 (No Drought)

Description:
TCI is used to determine stress on vegetation caused by high temperatures and dryness.

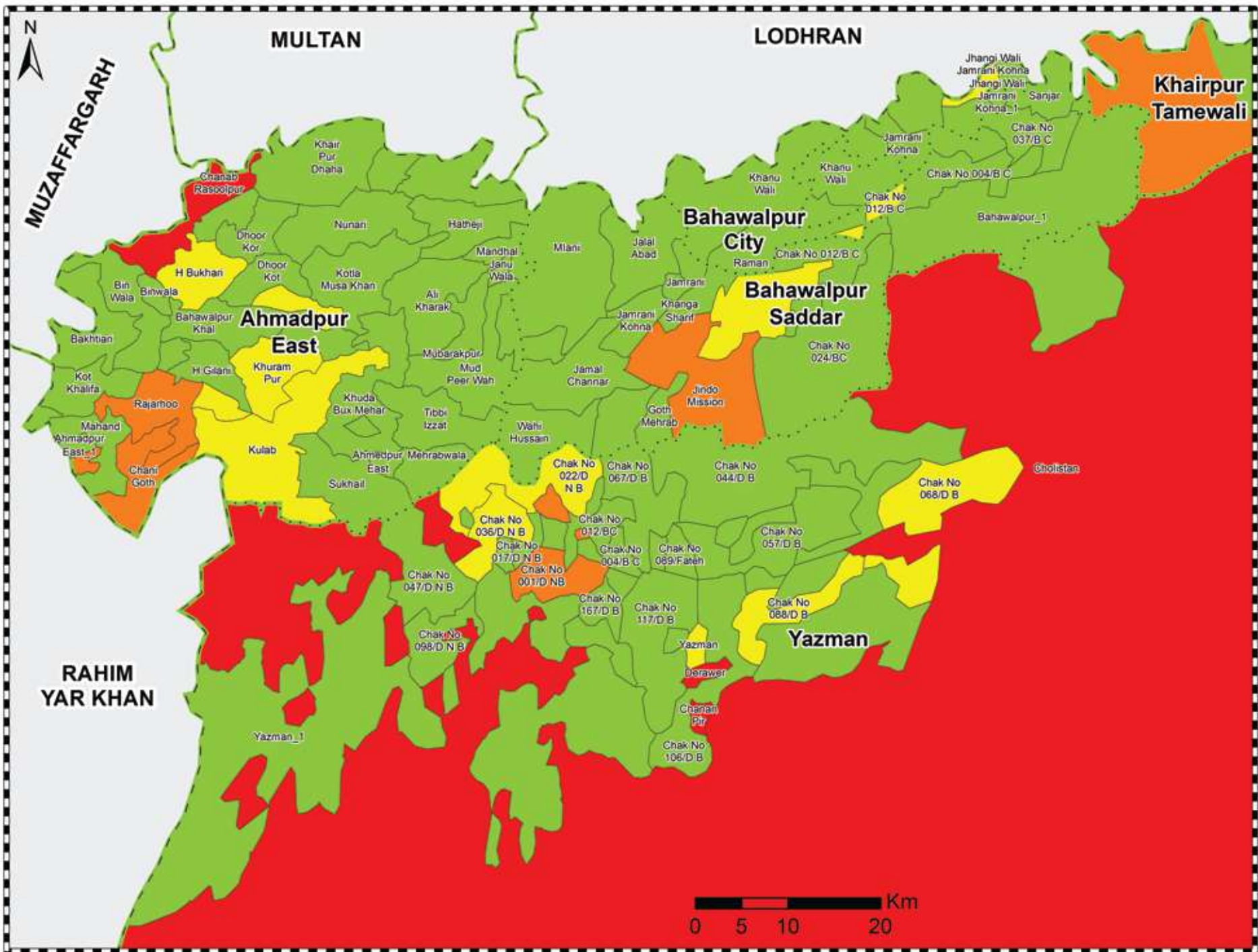
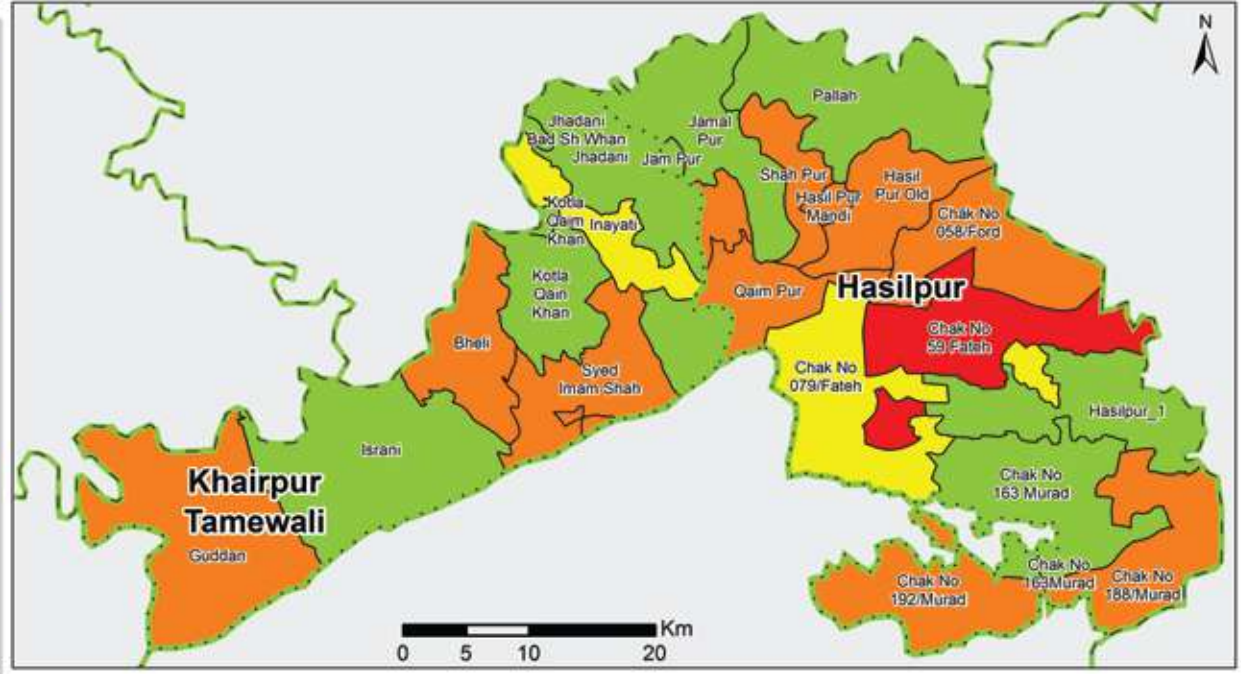
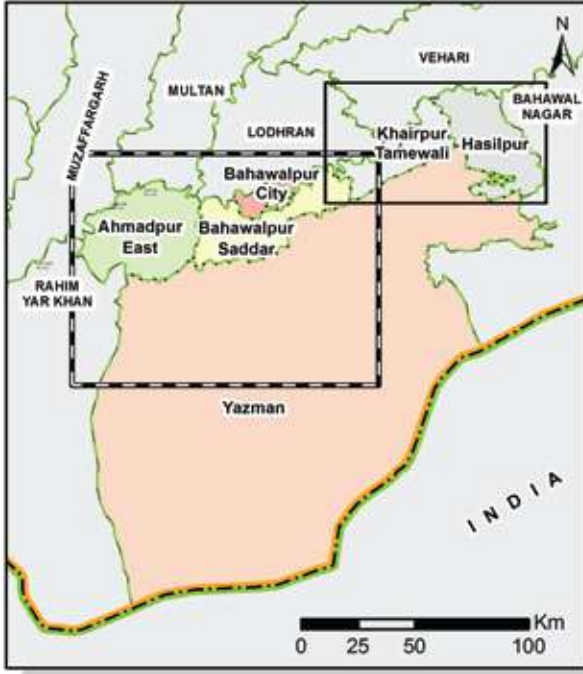
Normalized Difference Vegetation Index (NDVI)



- Legend:**
- -0.3-0
 - 0.01-0.1
 - 0.11-0.3
 - 0.31-0.6
 - 0.61-0.9

Description:
The NDVI utilizes satellite imagery to evaluate variations in the normalized difference between the reflectance in near infrared (NIR) and visible red bands, which are responsive to changes in vegetation. Higher NDVI values reflect healthy vegetation, whereas lower NDVI values depict stress condition.

FREQUENTLY DROUGHT PRONE UNION COUNCILS



Legend

Drought Severity Index (FDP)

- No Drought
- Mild Drought
- Moderate Drought
- Severe Drought
- Extreme Drought

abc Union Council Boundary

- abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

United Nations
World Food Programme

MAP INFORMATION

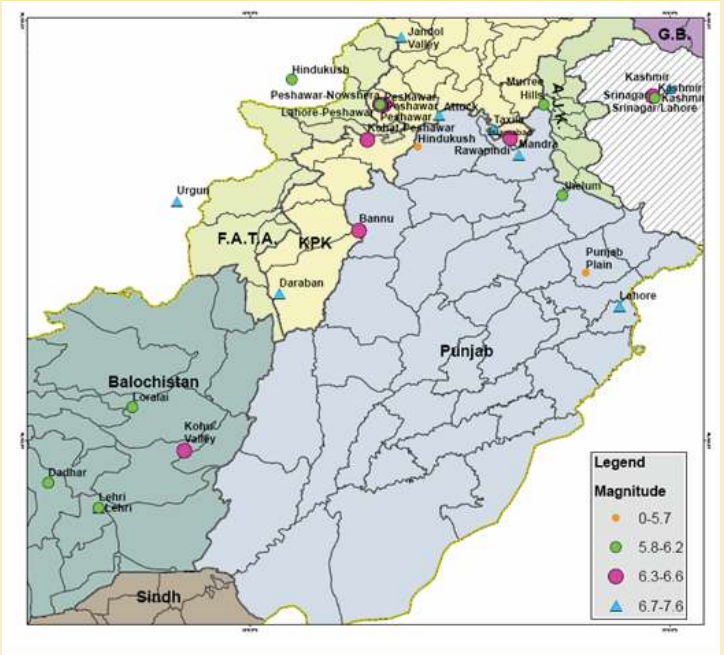
Data Source(s):
Pakistan Council of Research In Water Resources
SCARPs Monitoring Organization, WAPDA.

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-MAR-2016-HAZ-02-NDMA-002
Prepared by: Project Management Unit, NDMA
Last Updated: 7th March, 2017

Earthquake is defined as shaking and vibration at the surface of the earth resulting from underground movement along a fault plan from volcanic activity, cryoseismic activity, the sudden cracking of frozen soil or rock or due to movement of plate boundaries of the Earth. Earthquakes hazard at a site is characterized by either probabilistic or deterministic seismic hazard analysis. Probabilistic seismic hazard analysis involves the quantification of rate of probability of exceedance taking into consideration all possible earthquakes. Deterministic analysis evaluates the site specific seismic hazard that is influenced by maximum hazard from controlling sources. The general Probabilistic seismic hazard analysis procedure involves quantifying the annualized rate of exceedance of specified ground motions of various intensities, which is transformed to obtain the probability of exceedance of ground motions within the lifetime of the structure and infrastructure of interests. No major fault line passes through District Bahawalpur. According to the historical catalogues used in this assessment, this district has mainly experienced earthquakes in the range of magnitude 5-6. The main findings of the probabilistic seismic hazard assessment were that the ground motions in District Bahawalpur show no significant variability throughout the district when ground motions are mapped for tehsil level, and the same pattern continues at UC level. The following table shows the PGA based values against each settlement type in District Bahawalpur. Some of the most important historical seismic events in the region are shown below.

Historical Seismic Events



For the purpose of seismic designs of buildings, Pakistan has been divided into 5 Zones. These Zones are based on Peak Ground Acceleration (PGA). Ranges are shown in Table below:

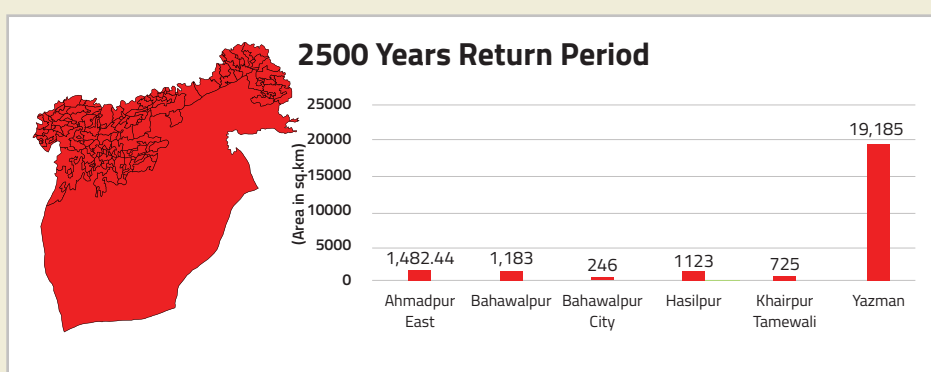
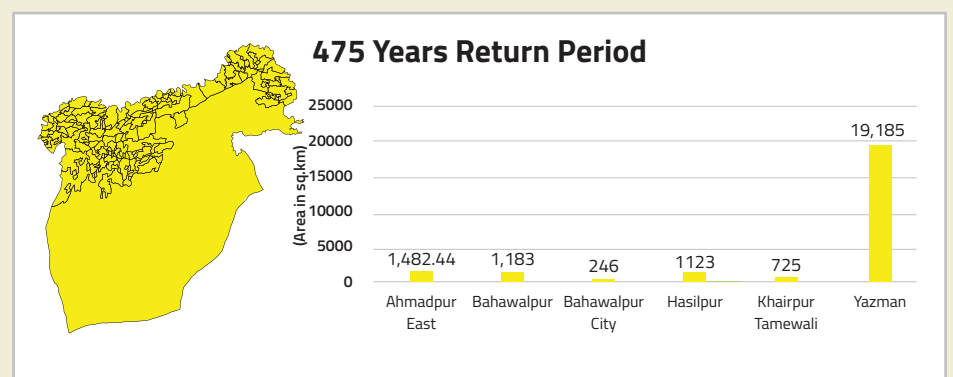
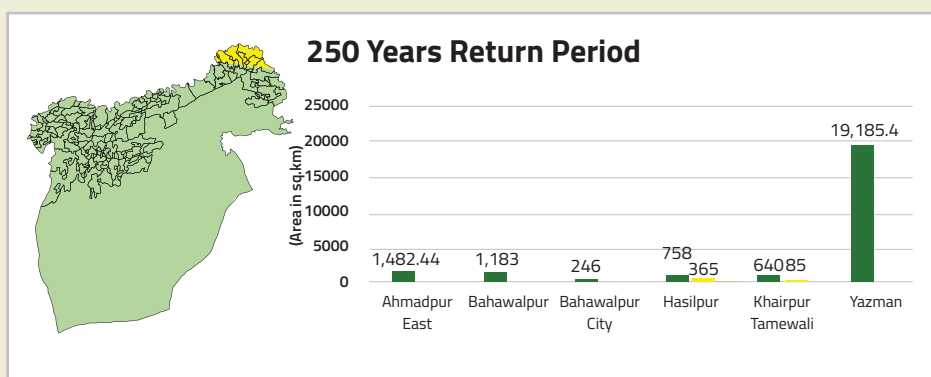
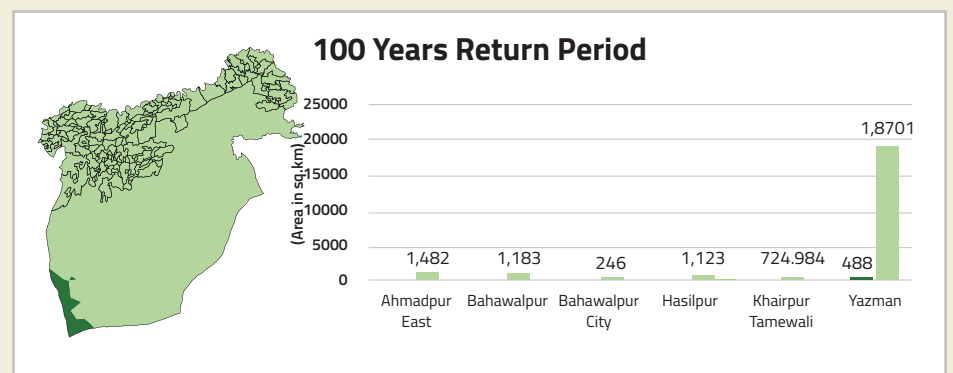
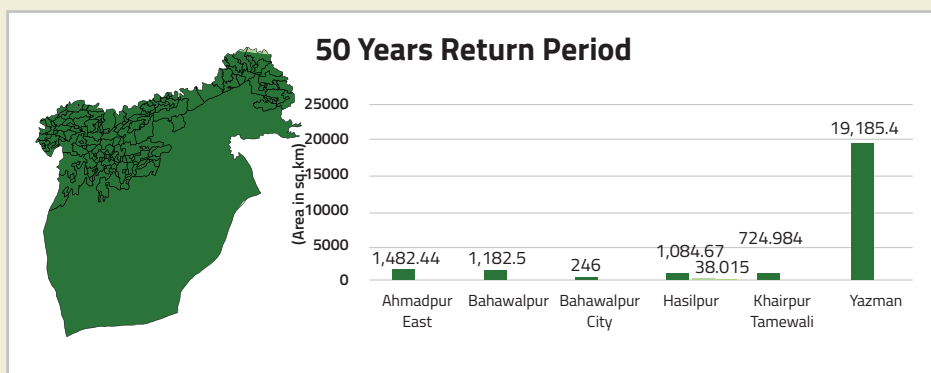
| Zone | Intensity | Ground Motion (g) | PGA (g*) |
|------|-----------|-------------------|----------|
| 1 | Very Low | 0.01 – 0.08 | 0.08 |
| 2A | Low | 0.08 – 0.16 | 0.15 |
| 2B | Medium | 0.16 – 0.24 | 0.20 |
| 3 | High | 0.24 – 0.32 | 0.30 |
| 4 | Very High | > 0.32 | 0.40 |

*Where g is acceleration due to gravity

Methodology of Assessment

The first step was the definition of area of interest followed by the compilation of Earthquake Catalogue from different national and international sources. The catalogues were homogenized, declustered and checked for completeness. Ground Motion Prediction Equations (GMPEs) were selected and the data was processed in a hazard computation software (CRISIS). The output of the exercise was the probabilistic seismic hazard mapping on 50, 100, 250, 475 and 2500 years return periods. The next stage was Sensitivity Analysis of tools used in the study. The last step was Seismic Response Analysis of site soil using strong ground motions records using Deepsoil software. The final phase of assessment was the incorporation of site soil conditions for seismic microzonation to map site specific ground motions.

Seismic Hazard Maps Based on Return Periods (50,100,250,475 and 2500 Years)



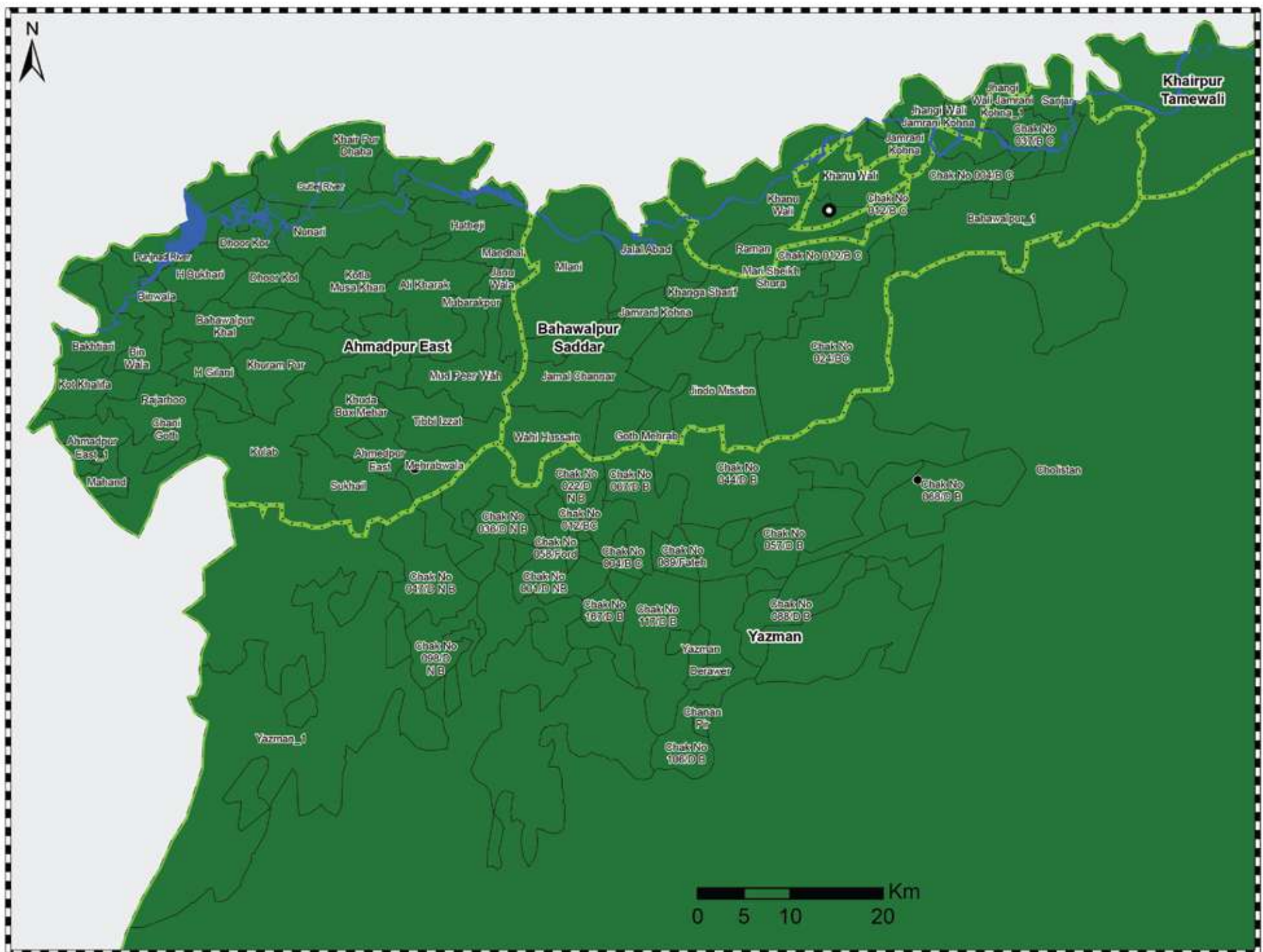
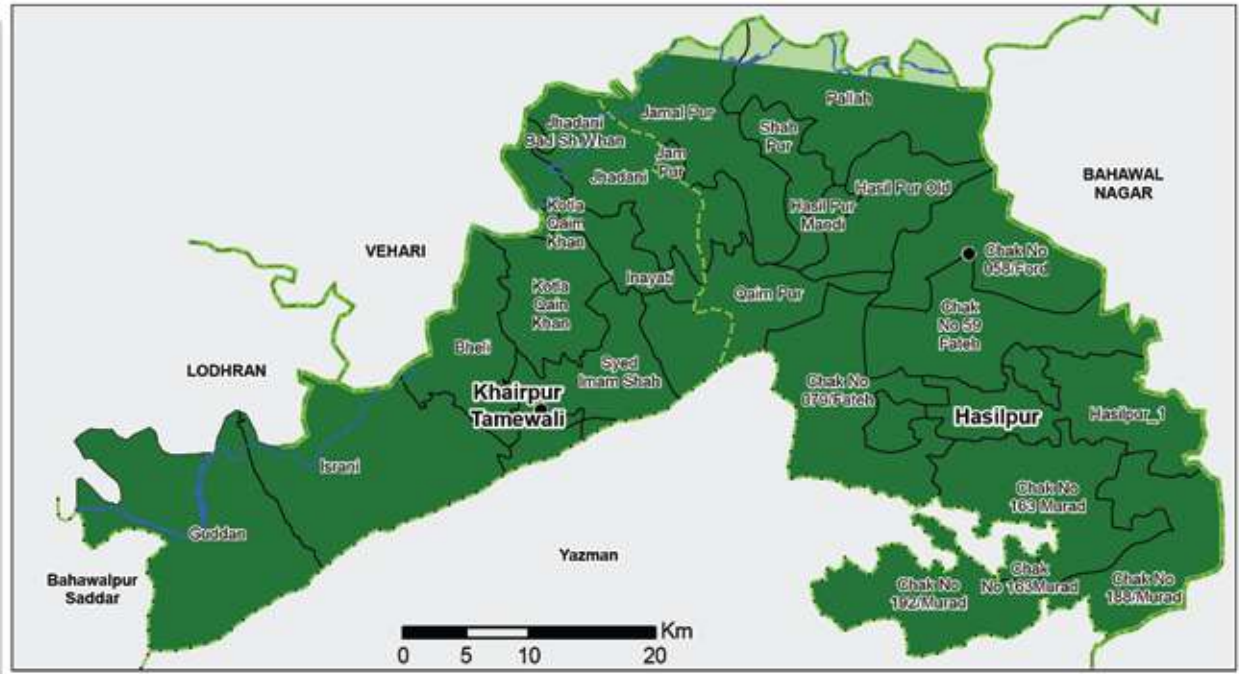
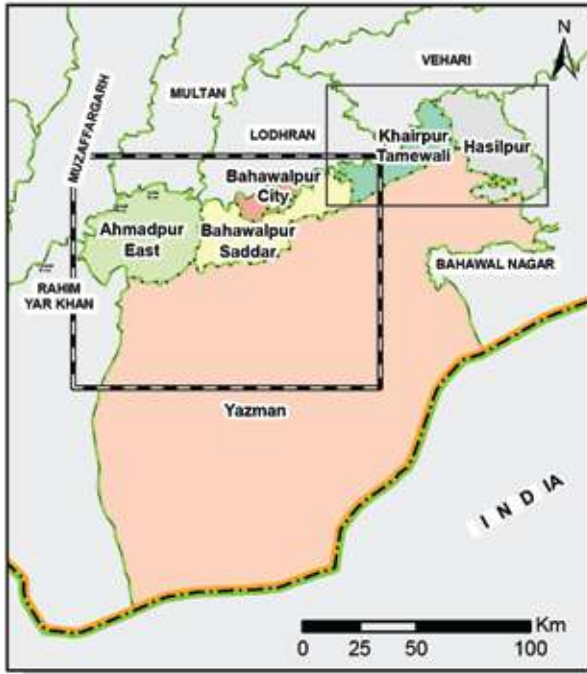
Hazard Zones (g)*

- Zone 1 (Very Low)
- Zone 2A (Low)
- Zone 2B (Medium)
- Zone 3 (High)
- Zone 4 (Very High)

Description:

Where return period is the recurrence interval of a flood. It is a statistical measurement particularly based on previous data.

EARTHQUAKE HAZARD 50 YEARS RETURN PERIOD



Legend

- District Headquarter
- Tehsil Headquarter
- River and Water Body
- Union Council Boundary
- Tehsil Boundary
- District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Hazard Zone*

| | | |
|----|--------------|-----------|
| 1 | (0.05-0.08g) | Very Low |
| 2A | (0.08-0.16g) | Low |
| 2B | (0.16-0.24g) | Medium |
| 3 | (0.24-0.32g) | High |
| 4 | (>0.32g) | Very High |

*Zones are defined as per classification of Pakistan Engineering Council. Whereas Unit "(g)" is gravity

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

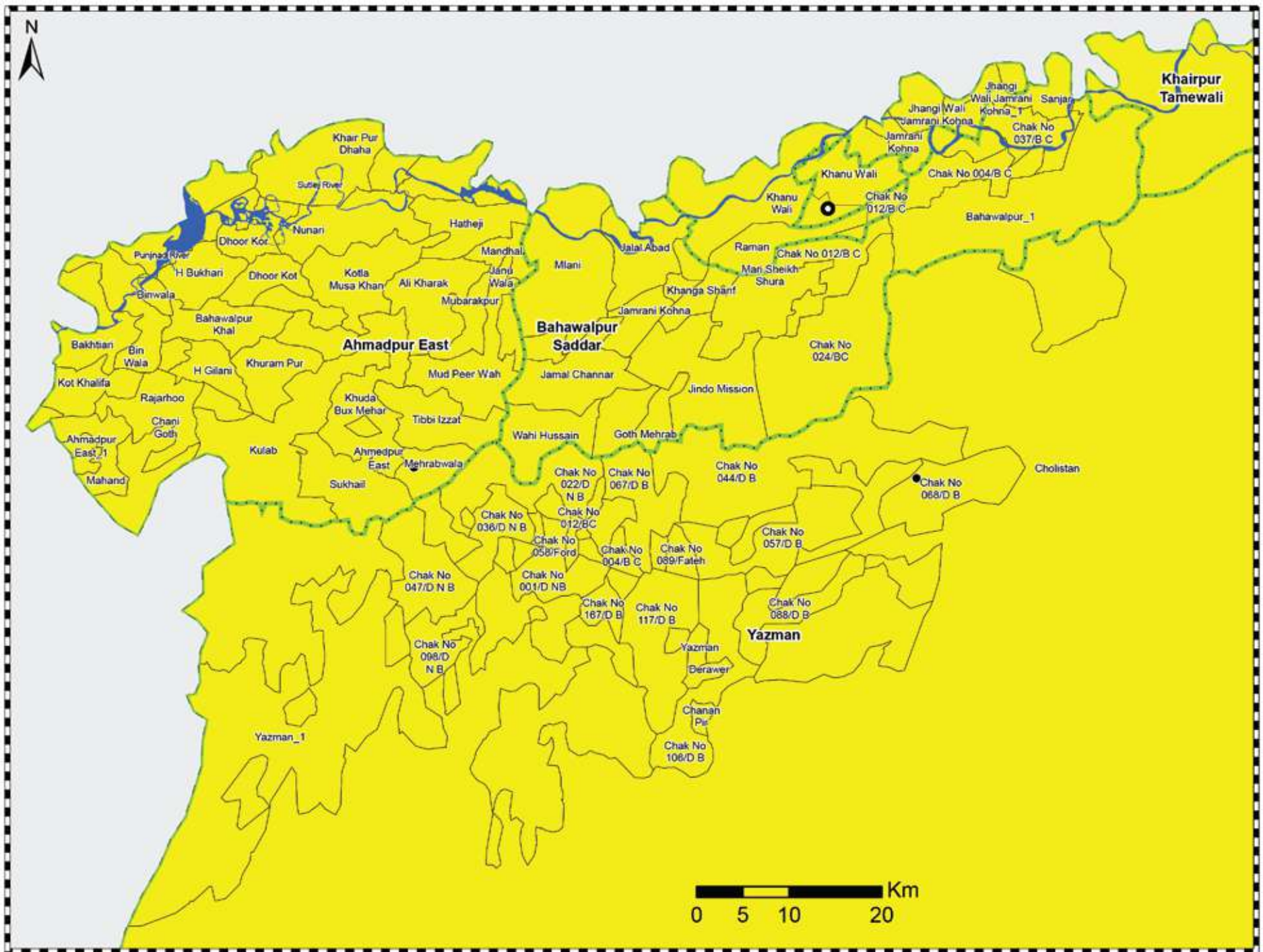
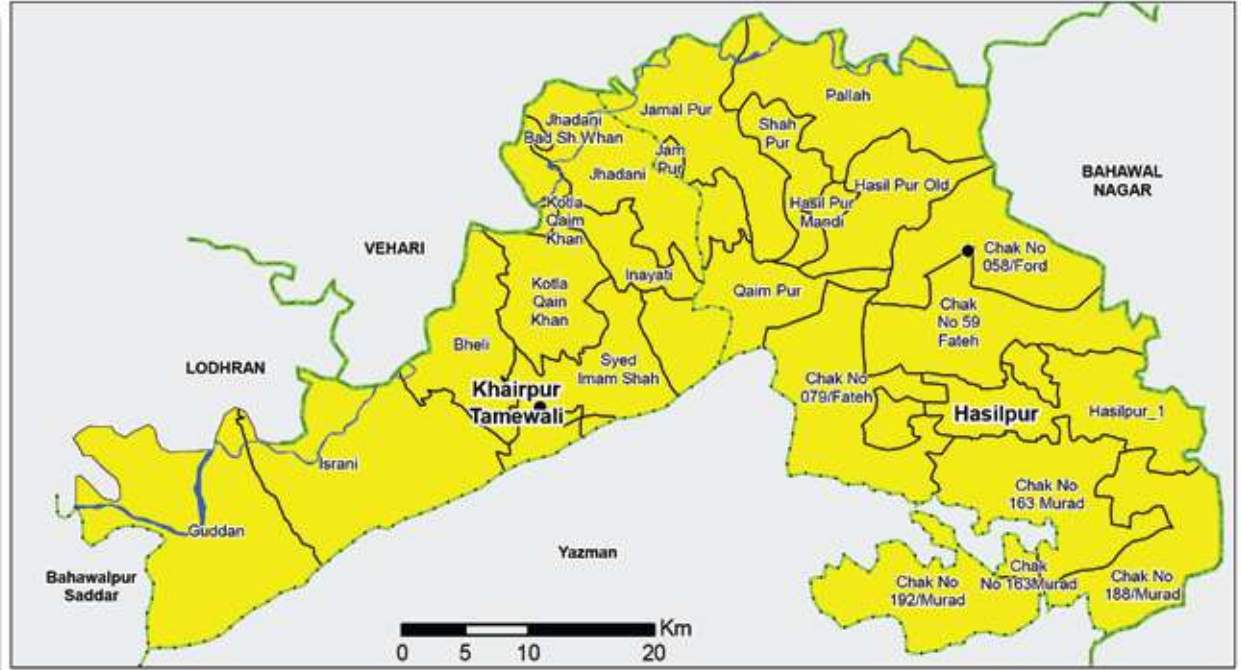
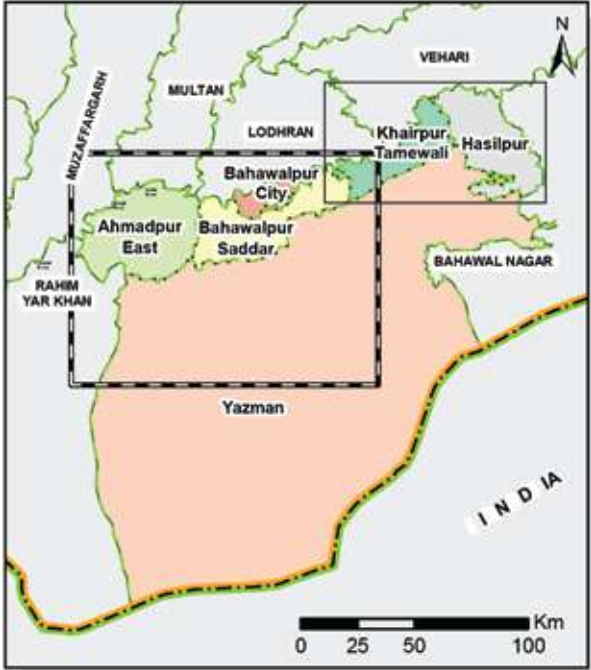
MAP INFORMATION

Data Source(s):
Pakistan Meteorological Department
Geological Survey of Pakistan

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-MAR-2016-HAZ-03-NDMA-50
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

EARTHQUAKE HAZARD 475 YEARS RETURN PERIOD



Legend

- District Headquarter
 - Tehsil Headquarter
 - | | |
|--|------------------------|
| | River and Water Body |
| | Union Council Boundary |
| | Tehsil Boundary |
| | District Boundary |
| | Provincial Boundary |
| | Line of Control |
| | International Boundary |
- Hazard Zone***
- | | | | |
|--|----|--------------|-----------|
| | 1 | (0.05-0.08g) | Very Low |
| | 2A | (0.08-0.16g) | Low |
| | 2B | (0.16-0.24g) | Medium |
| | 3 | (0.24-0.32g) | High |
| | 4 | (>0.32g) | Very High |

*Zones are defined as per classification of Pakistan Engineering Council. Whereas Unit "(g)" is gravity

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan



MAP INFORMATION

Data Source(s):
Pakistan Meteorological Department
Geological Survey of Pakistan

Datum: WGS 1984
Units: Degree

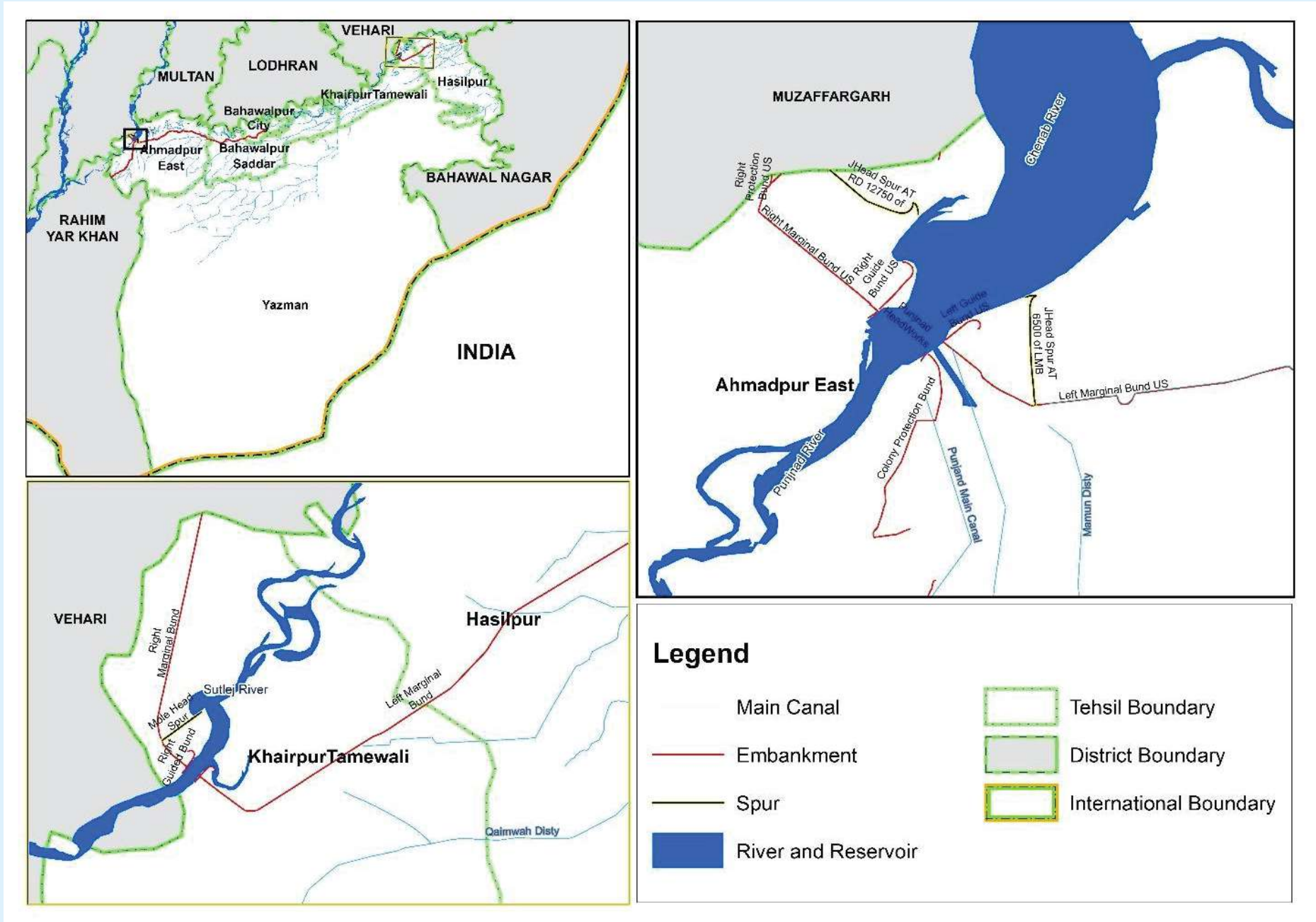
Map No: MHVRA-PUN-603-MAR-2016-HAZ-03-NDMA-475
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

District Bahawalpur shares boundaries with district Lodhran to the North, Bahawalnagar to its East, and Rahim Yar Khan to its West. Southern part of the district is covered by Cholistan desert. River Sutlej enters Bahawalpur from the Western side and flows across the Northern boundary of the district. As part of flood mitigation, following flood protection structures have been put in place:

Flood Protection Bunds

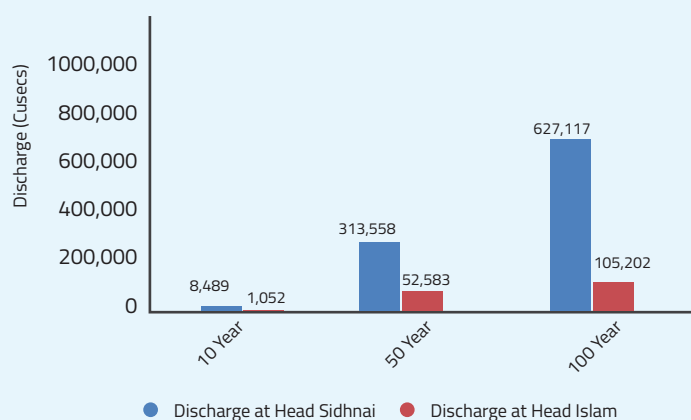
- Left Marginal bund near Head Punjnad
- Minchin Bund
- Fatuwali Bund
- Empress Bund
- Empress Khanwah Bund
- Khanwah Weeslan Bund
- Elachiwah Goth Lashkar Bund
- Jhangiwal Sahlan Bund
- Left Retired Embankment Head Islam

Flood Protection Structures



In this study for flood hazard assessment, return periods of 10, 50 and 100 years have been taken in account based on probability of occurrence for the flood modelling. Discharge values for the respective return periods have been considered at 2 headworks i.e. Sidhnai and Islam.

Discharge Values for Return Period 10,50,100 Years

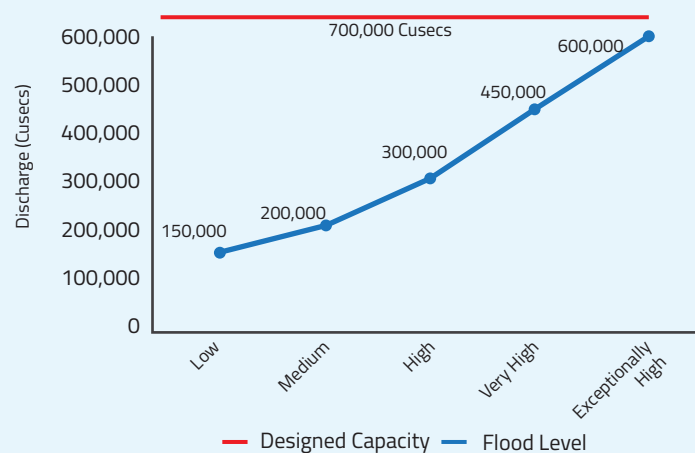


Early Warning & Response Time for Riverine Floods (in Hours)

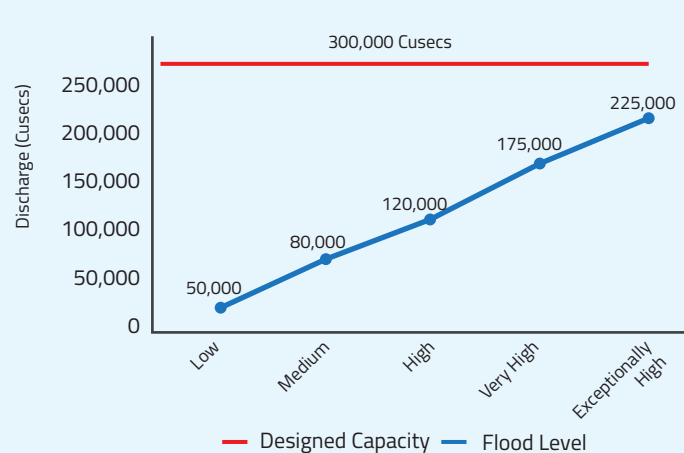
| | Trimmu to Punjnad | Sidhnai to Punjnad | Islam to Punjnad |
|-------------------------|-------------------|--------------------|-------------------|
| Flood Intensity | 265.54 | 233.35 | 209.21 |
| Flood Intensity | Time (Hrs) | Time (Hrs) | Time (Hrs) |
| Low Supplies | 160 | 100 | 93 |
| Low | 93 | 90 | 75 |
| Medium | 80 | 75 | 60 |
| High | 60 | 55 | 44 |
| Very High Flood | 55 | 50 | 36 |
| Supper Flood as in 1973 | 50 | 45 | 30 |
| Supper Flood as in 1992 | 78 | 60 | 30 |
| Very High Flood (2014) | 121 | 82 | - |

Flood Limits for River Chenab (Punjab Head) and River Sutlej (Islam Head)

Flood Limits Punjab Headwork (Chenab)



Flood Limits Islam Headwork (Sutlej)

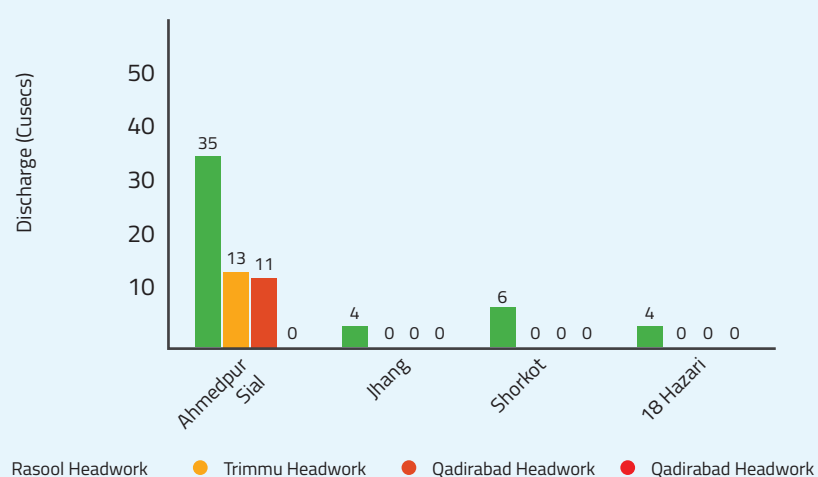


Historical Floods

| Year | Discharge (Cs) |
|----------------------|----------------|
| Super Flood of 1973 | 803,000 |
| Super Flood of 1992 | 812,000 |
| High Flood of 2010 | 312,000 |
| Low Flood of 2011 | 153,000 |
| High Flood of 2013 | 317,000 |
| Very High Flood 2014 | 453,000 |
| Very Low Flood 2015 | 139,000 |

Settlements Vulnerable to Floods based on Past Inundation

Tehsilwise Distribution of Settlements Vulnerable to Floods Based on Inundation Frequency (2010-2015)



Flood Loses 2014

| Year | 1988 | 1992 | 1995 | 2014 |
|--------------------------------|------------|---------|--------|--------|
| Nature of Disaster | High Flood | -do- | -do- | -do- |
| Lives Affected | 5,239 | 10,505 | 19,660 | 5,690 |
| Property / Houses Affected | 849 | 2,856 | 1,915 | 1,230 |
| Crops/Area Affected (In Acres) | 41,487 | 118,785 | 84,931 | 32,260 |

Assessment Methodology

The HEC-RAS hydraulic model has been used for hydraulic modelling of the area, with an average discharge value observed at Sidhna and Islam Head for consecutive 10, 50 and 100 years. For model inputs, geometric data (stream centerline, flow paths, channel banks, cut lines and cross-sections) has been developed in HEC-GeoRAS. Aster-SRTM DEM has been preprocessed and used for conversion into TIN, to be used as the elevation input in modelling for generation of flood hazard maps. Modelling results are then processed in ArcGIS for floodplain delineation. Flood hazard maps are then generated as the final result using inundation depth grid and satellite imagery. These maps show the severity of flood hazard at any given point in the area

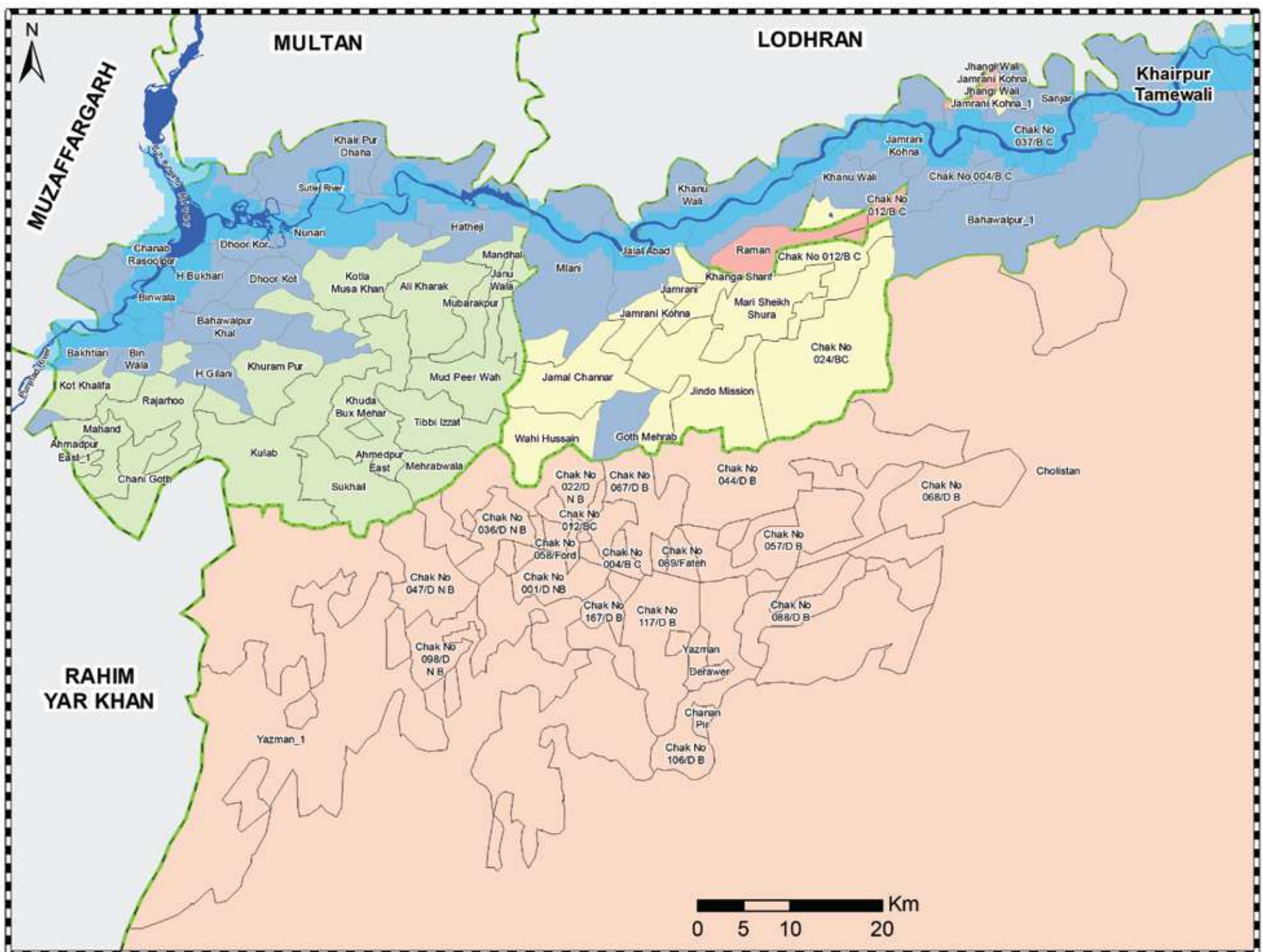
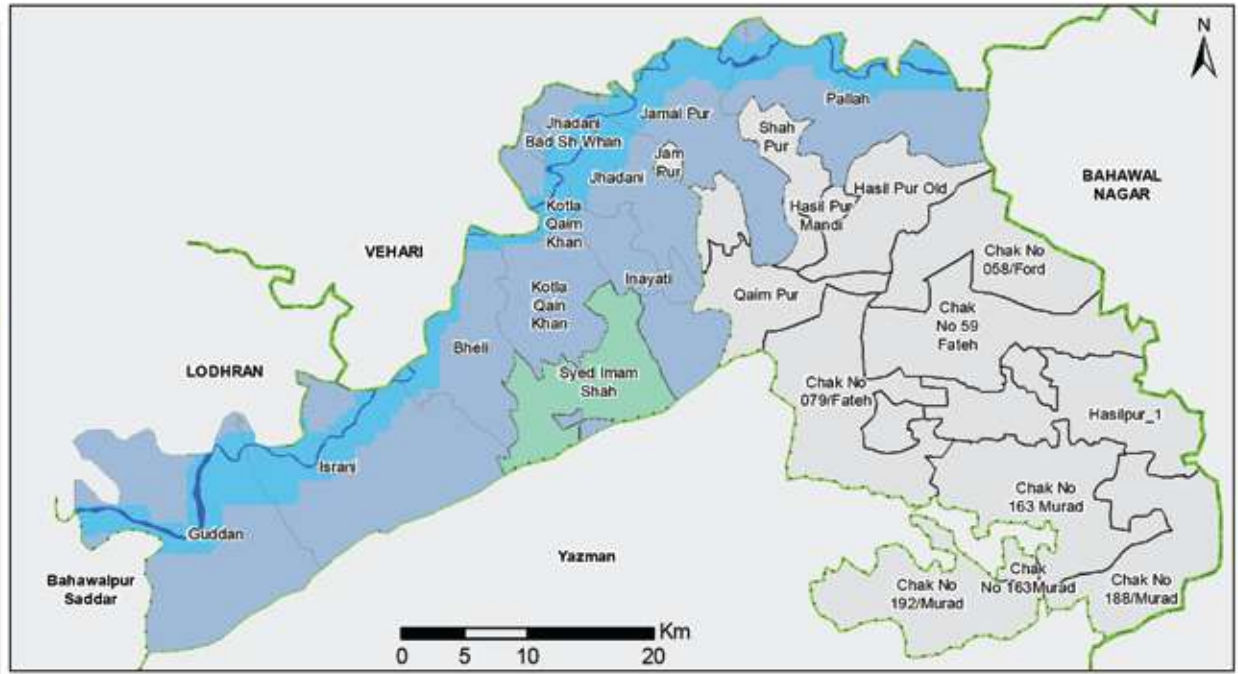
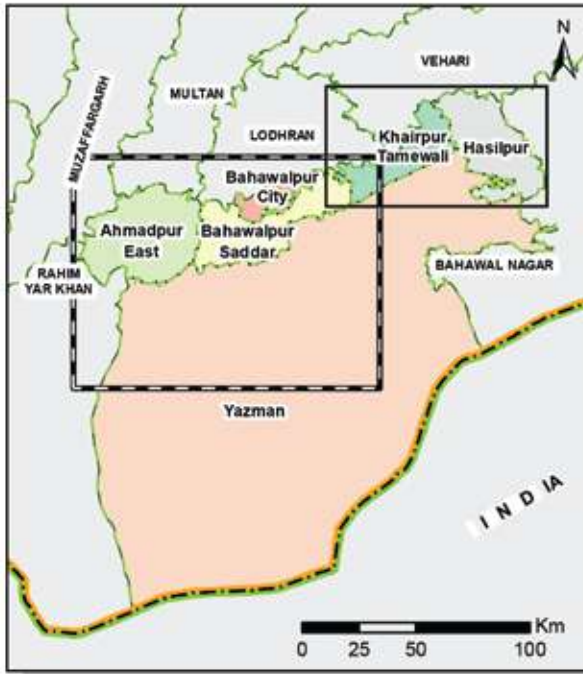
Damages & Losses (2014 Floods)

| UNION COUNCILS | Housing | | | | | | Crops Damage (in Acres) | |
|--------------------|------------------------|-------|-------------------|--------------------|-------------|-------|-------------------------|--------|
| | By Building Topologies | | By Damag Extent | | By Locality | | | Total |
| | Kaccha | Pacca | Partially Damaged | Completely Damaged | Urban | Rural | | |
| 72 | 3 | 0 | 1 | 2 | 0 | 3 | 2 | - |
| Bakhtiari | 162 | 7 | 39 | 141 | 0 | 179 | 179 | 6067 |
| Banwala | 28 | 2 | 9 | 21 | 0 | 30 | 30 | 2638 |
| Tahir Wali | - | - | - | - | - | - | - | 7451 |
| Rasoolpur | - | - | - | - | - | - | - | 1331 |
| Kotla Musa | - | - | - | - | - | - | - | 1660 |
| Khan/Khairpur Daha | - | - | - | - | - | - | - | - |
| | 193 | 9 | 49 | 164 | 0 | 212 | 211 | 19,147 |

*Partially damaged means "less than 40% damage" implies that the structure can be put to use with minor improvement work.

*Fully damaged means "40% and above damage" implies that the structure / facility needs to be demolished and re-constructed.

FLOOD HAZARD 10 YEARS RETURN PERIOD



Legend

| | |
|-----------------------------|-------------------|
| Flood 10 Year Return Period | Tehsil Boundary |
| Flood Exposed UCs | Ahmadpur East |
| River and Water Body | Bahawalpur City |
| Union Council Boundary | Bahawalpur Saddar |
| District Boundary | Hasilpur |
| Provincial Boundary | Khairpur Tamewali |
| Line of Control | Yazman |
| International Boundary | |

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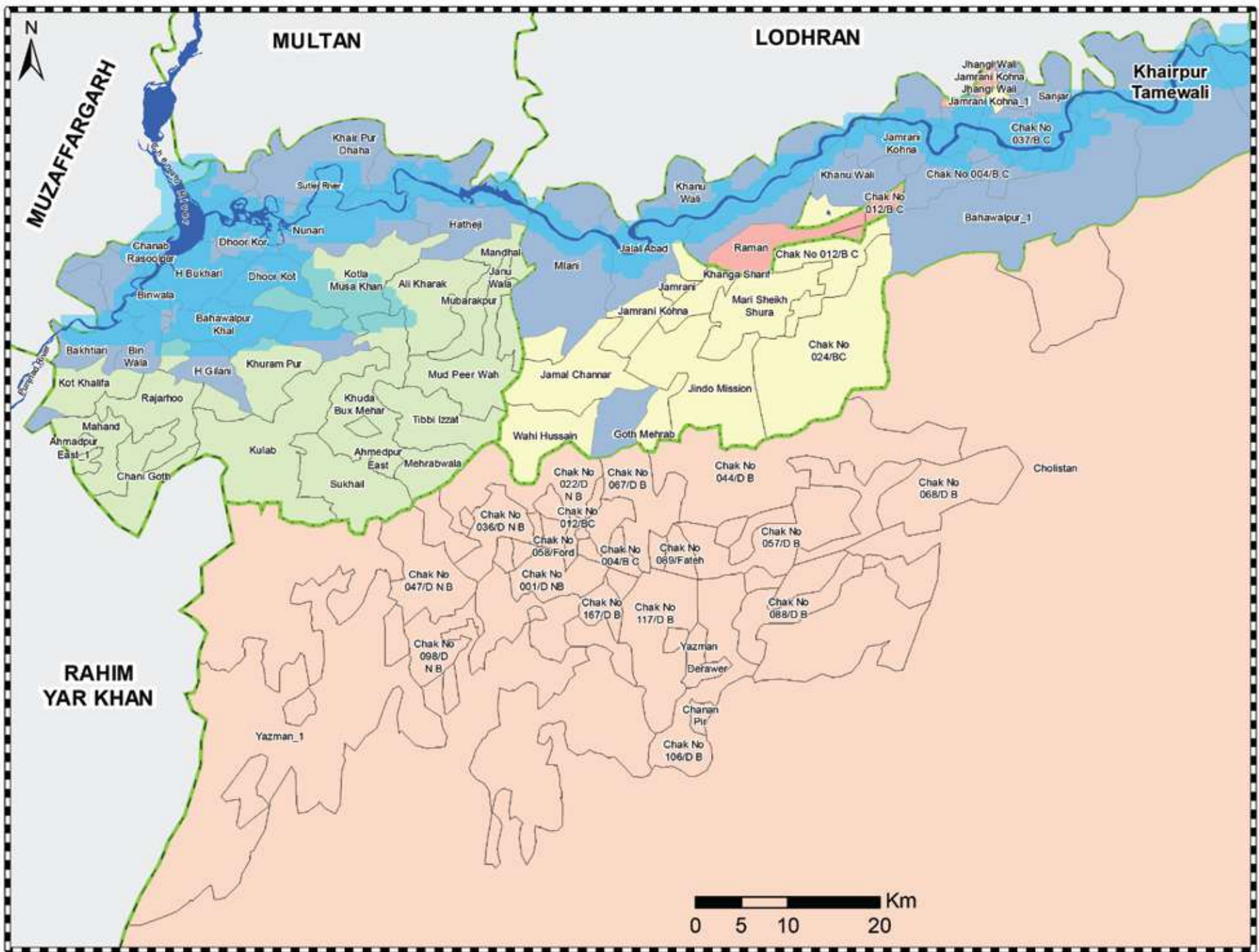
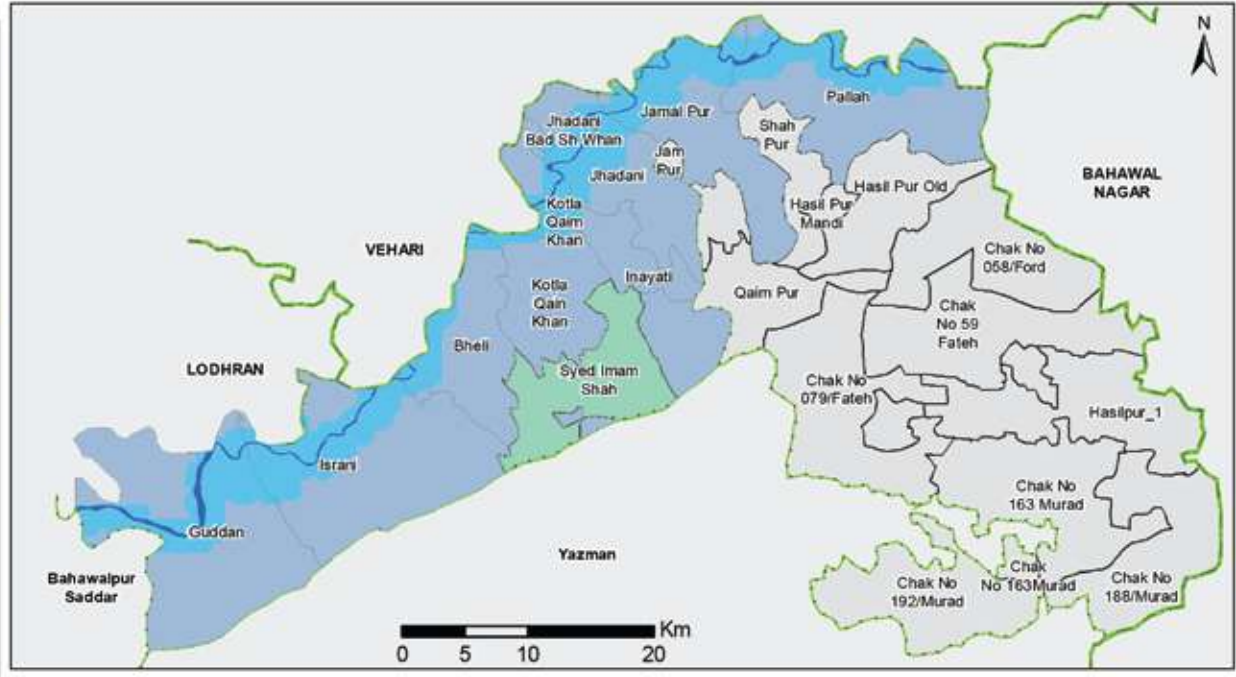
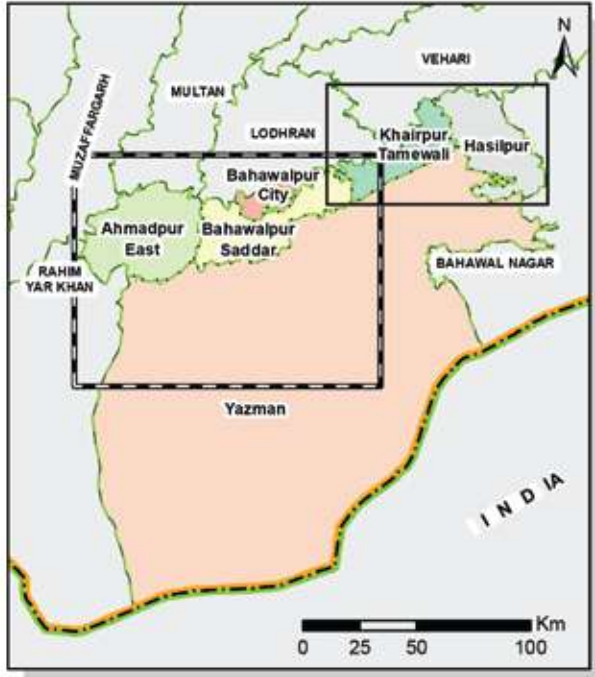
MAP INFORMATION

Data Source(s):
NDMA,
SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-MAR-2016-HAZ-04-NDMA-002
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

FLOOD HAZARD 50 YEARS RETURN PERIOD



Legend

- Flood 50 Year Return Period
- Flood Exposed UCs
- River and Water Body
- Union Council Boundary
- District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Tehsil Boundary

- Ahmadpur East
- Bahawalpur City
- Bahawalpur Saddar
- Hasilpur
- Khairpur Tamewali
- Yazman

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

United Nations World Food Programme

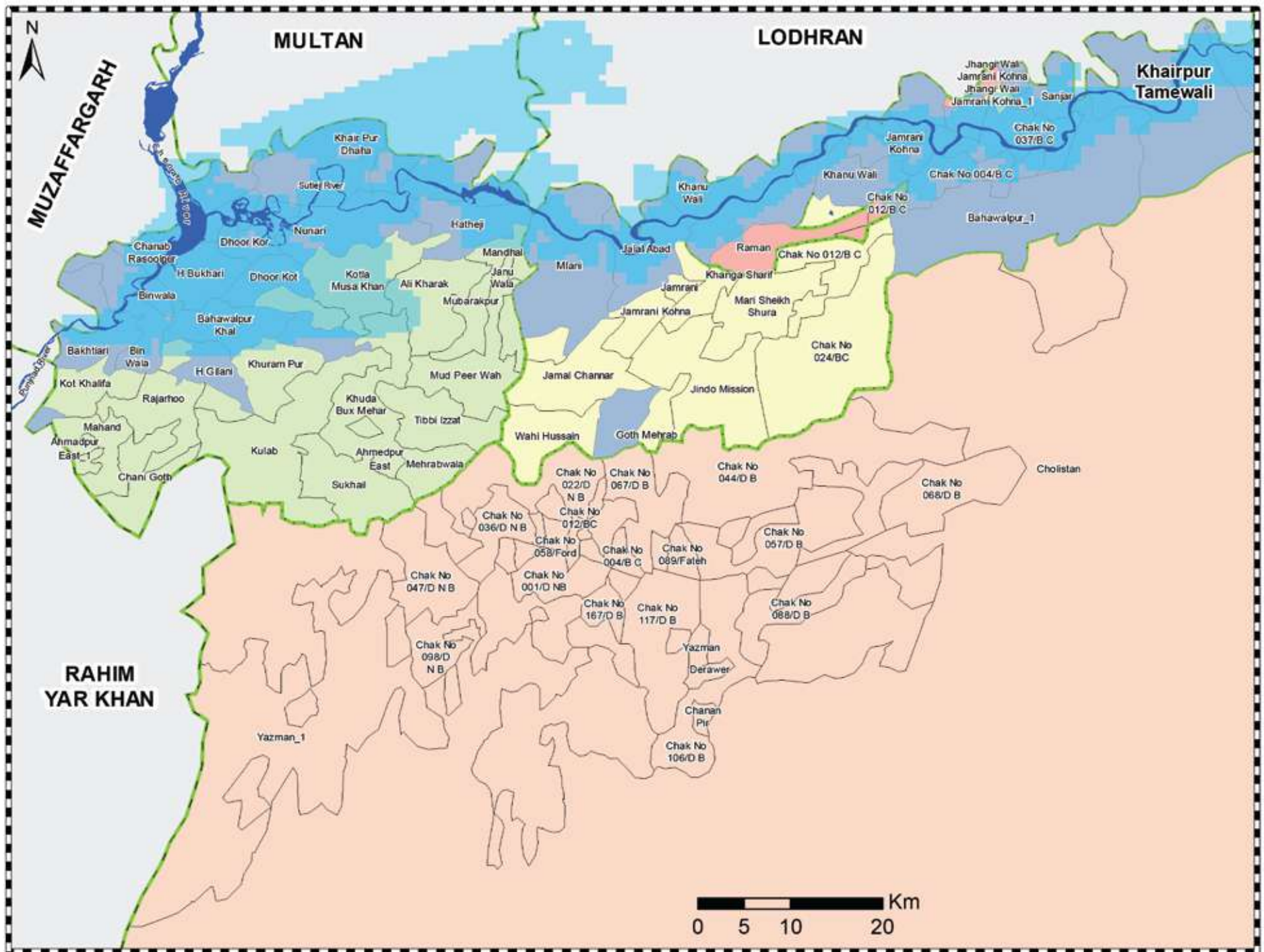
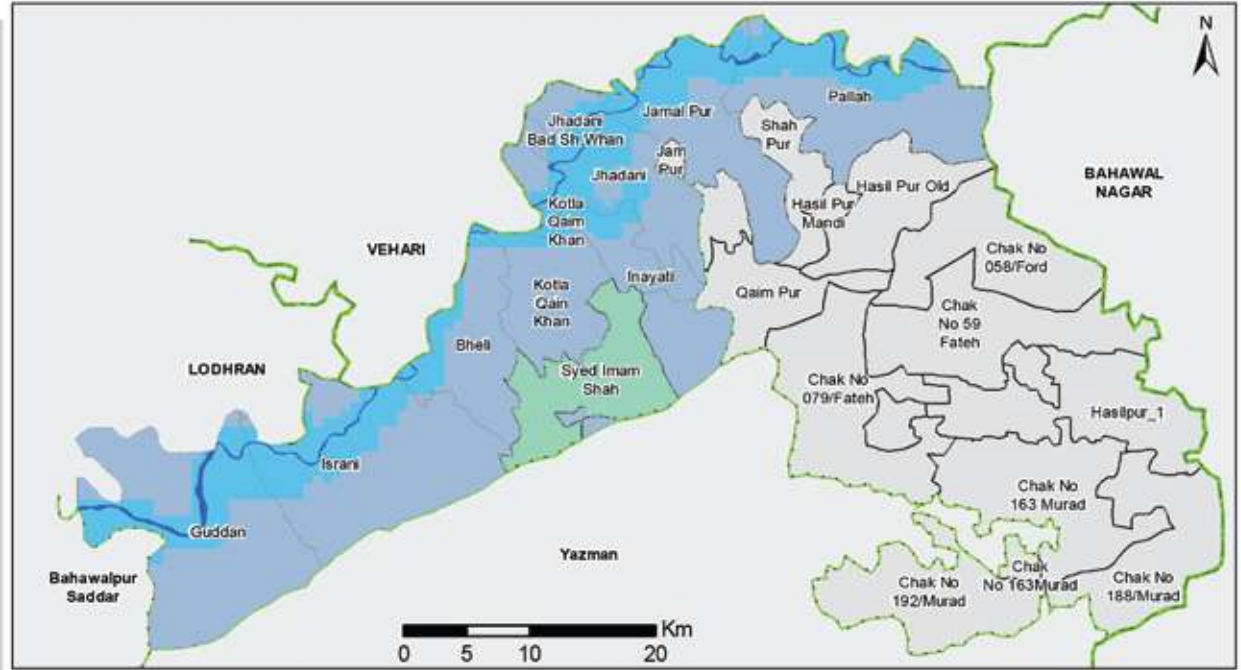
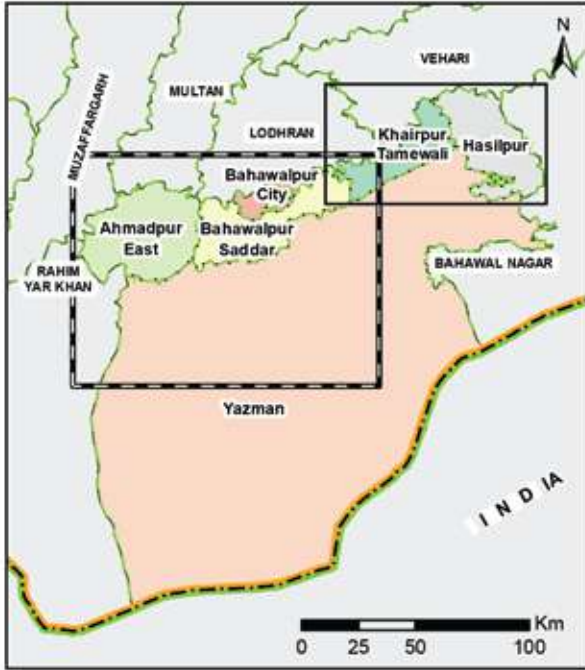
MAP INFORMATION

Data Source(s): NDMA, SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-MAR-2016-HAZ-04-NDMA-003
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

FLOOD HAZARD 100 YEARS RETURN PERIOD



Legend

| | |
|------------------------------|-------------------|
| Flood 100 Year Return Period | Tehsil Boundary |
| Flood Exposed UCs | Ahmadpur East |
| River and Water Body | Bahawalpur City |
| Union Council Boundary | Bahawalpur Saddar |
| District Boundary | Hasilpur |
| Provincial Boundary | Khairpur Tamewali |
| Line of Control | Yazman |
| International Boundary | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
NDMA, SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-MAR-2016-HAZ-04-NDMA-004
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017



C

EXPOSURE ASSESSMENT

- DROUGHT
- EARTHQUAKE
- FLOOD



| UNION COUNCILS | DEMOGRAPHICS | | | SETTLEMENTS | LAND USE & LAND COVER TYPE (AREA IN HA) | | | | | AGRICULTURE CROPS (AREA IN HA) | | | DROUGHT PRONE | FREQUENTLY DROUGHT PRONE |
|---------------------------|--------------|---------|---------|-------------|---|---------------------|--------------|---------------|----------|--------------------------------|-----------|-----------|---------------|--------------------------|
| | POPULATION | MALE | FEMALE | | CROP IRRIGATED | CROP IN FLOOD PLAIN | CROP RAINFED | CROP MARGINAL | ORCHARDS | KHARIF CROP | | RABI CROP | | |
| | | | | | | | | | | RICE | SUGARCANE | WHEAT | | |
| AHMADPUR EAST | | | | | | | | | | | | | | |
| AHMADPUR EAST_1 | 6,872 | 3,634 | 3,238 | 1 | 460 | 0 | 0 | 0 | 0 | 3 | 0 | 240 | MI | MI |
| AHMEDPUR EAST | 11,313 | 6,021 | 5,292 | 2 | 395 | 0 | 0 | 0 | 0 | 0 | 0 | 262 | MI | MI |
| ALI KHARAK | 38,976 | 20,385 | 18,591 | 17 | 5,787 | 0 | 0 | 0 | 13 | 11 | 235 | 4,129 | MI | MI |
| BAHAWALPUR KHALWAN | 90,965 | 47,399 | 43,566 | 18 | 8,285 | 0 | 0 | 0 | 0 | 2 | 298 | 5,552 | SE | MI |
| BAKHTIARI | 35,574 | 18,498 | 17,076 | 4 | 4,414 | 273 | 0 | 0 | 0 | 3 | 93 | 3,230 | MI | MI |
| BIN WALA | 40,047 | 20,880 | 19,167 | 14 | 5,788 | 695 | 0 | 0 | 0 | 4 | 52 | 4,360 | MI | MI |
| BINWALA | 6,991 | 3,760 | 3,231 | 1 | 659 | 5 | 0 | 0 | 0 | 0 | 16 | 239 | MI | MI |
| CHANAB RASOOLPUR | 41,492 | 21,620 | 19,872 | 8 | 2,674 | 993 | 0 | 0 | 0 | 0 | 8 | 2,549 | EX | EX |
| CHANI GOTH | 38,074 | 19,738 | 18,336 | 8 | 3,853 | 0 | 0 | 0 | 0 | 29 | 106 | 2,686 | SE | SE |
| DHOOR KOR | 17,050 | 8,908 | 8,142 | 3 | 2,133 | 579 | 0 | 0 | 0 | 0 | 11 | 1,942 | EX | MI |
| DHOOR KOT | 23,118 | 12,224 | 10,895 | 8 | 3,633 | 466 | 0 | 91 | 0 | 19 | 85 | 2,637 | MI | MI |
| H BUKHARI | 32,763 | 17,291 | 15,472 | 4 | 3,591 | 88 | 0 | 0 | 33 | 29 | 172 | 2,003 | SE | MO |
| H GILANI | 14,113 | 7,345 | 6,767 | 11 | 3,698 | 0 | 0 | 0 | 0 | 8 | 458 | 1,839 | MI | MI |
| HATHEJI | 42,631 | 22,173 | 20,458 | 8 | 4,540 | 0 | 0 | 0 | 0 | 0 | 367 | 2,873 | EX | MI |
| JANU WALA | 16,376 | 8,623 | 7,752 | 2 | 396 | 0 | 0 | 0 | 0 | 0 | 63 | 216 | MI | MI |
| KHAIR PUR DHAHA | 34,382 | 18,046 | 16,336 | 12 | 7,846 | 0 | 0 | 28 | 0 | 0 | 67 | 5,392 | MI | MI |
| KHUDA BUX MEHAR | 215,201 | 113,189 | 102,012 | 19 | 6,611 | 0 | 0 | 0 | 38 | 1 | 85 | 4,813 | MI | MI |
| KHURAM PUR | 30,869 | 16,119 | 14,750 | 22 | 6,829 | 0 | 0 | 1 | 0 | 0 | 390 | 4,992 | SE | MO |
| KOT KHALIFA | 38,377 | 19,854 | 18,523 | 6 | 4,194 | 0 | 0 | 0 | 0 | 36 | 86 | 2,713 | MO | MI |
| KOTLA MUSA KHAN | 39,638 | 20,902 | 18,736 | 17 | 6,416 | 0 | 0 | 34 | 4 | 2 | 270 | 4,446 | MI | MI |
| KULAB | 41,813 | 22,062 | 19,751 | 27 | 11,699 | 0 | 0 | 0 | 0 | 18 | 178 | 8,348 | SE | MO |
| MAHAND | 29,773 | 15,661 | 14,113 | 9 | 3,153 | 0 | 0 | 0 | 0 | 87 | 10 | 1,948 | MI | MI |
| MANDHAL | 44,257 | 23,168 | 21,089 | 3 | 1,811 | 0 | 0 | 0 | 0 | 0 | 202 | 978 | SE | MI |
| MEHRABWALA | 22,774 | 12,055 | 10,719 | 6 | 1,673 | 0 | 0 | 0 | 0 | 5 | 2 | 900 | SE | MI |
| MUBARAKPUR | 41,017 | 21,359 | 19,659 | 9 | 3,393 | 0 | 0 | 0 | 0 | 9 | 100 | 2,504 | MI | MI |
| MUD PEER WAH | 54,986 | 28,431 | 26,555 | 12 | 6,060 | 0 | 0 | 0 | 0 | 15 | 282 | 4,329 | MI | MI |
| NUNARI | 40,636 | 21,082 | 19,554 | 14 | 5,724 | 170 | 0 | 177 | 0 | 0 | 73 | 3,634 | MI | MI |
| RAJARHOO | 33,189 | 17,242 | 15,947 | 9 | 5,067 | 0 | 0 | 0 | 0 | 208 | 239 | 2,956 | SE | SE |
| SUKHAIL | 30,502 | 16,074 | 14,427 | 13 | 5,887 | 0 | 0 | 0 | 0 | 0 | 0 | 4,286 | SE | MI |
| TIBBI IZZAT | 44,846 | 23,582 | 21,264 | 10 | 5,320 | 0 | 0 | 19 | 0 | 20 | 208 | 3,651 | MI | MI |
| BAHAWALPUR | | | | | | | | | | | | | | |
| BAHAWALPUR_1 | 1,735 | 910 | 826 | 47 | 11,990 | 0 | 0 | 0 | 4 | 0 | 2 | 9,552 | MI | MI |
| CHAK NO 004/B C_1 | 35,067 | 18,457 | 16,610 | 16 | 4,176 | 0 | 0 | 0 | 0 | 0 | 19 | 3,535 | MI | MI |
| CHAK NO 012/B C_1 | 24,909 | 13,228 | 11,681 | 9 | 3,172 | 0 | 0 | 0 | 4 | 0 | 53 | 2,367 | MI | MI |
| CHAK NO 024/BC | 33,499 | 17,812 | 15,687 | 22 | 8,848 | 0 | 0 | 0 | 14 | 0 | 0 | 6,642 | SE | MI |
| CHAK NO 037/B C | 48,520 | 25,169 | 23,351 | 12 | 4,994 | 602 | 0 | 0 | 0 | 0 | 0 | 4,197 | SE | MI |
| GOth MEHRAB | 4,541 | 2,326 | 2,215 | 5 | 1,266 | 0 | 0 | 0 | 0 | 0 | 15 | 1,009 | SE | MI |
| JALAL ABAD | 27,659 | 14,563 | 13,097 | 9 | 5,199 | 134 | 0 | 19 | 0 | 31 | 464 | 3,113 | MI | MI |
| JAMAL CHANNAR | 39,029 | 20,507 | 18,522 | 17 | 6,368 | 0 | 0 | 47 | 0 | 44 | 1,126 | 3,397 | SE | MI |
| JAMRANI | 3,484 | 1,789 | 1,696 | 3 | 607 | 0 | 0 | 5 | 9 | 29 | 121 | 334 | MI | MI |
| JAMRANI KOHNA_1 | 31,326 | 16,421 | 14,905 | 9 | 4,233 | 0 | 0 | 7 | 7 | 56 | 739 | 2,219 | MI | MI |
| JHANGI WALI JAMRANI KOHNA | 567 | 302 | 265 | 0 | 403 | 0 | 0 | 0 | 0 | 0 | 0 | 285 | MI | MI |
| JINDO MISSION | 43,148 | 22,617 | 20,531 | 21 | 7,701 | 0 | 0 | 0 | 0 | 0 | 253 | 6,294 | SE | SE |
| KHANGA SHARIF | 33,878 | 17,639 | 16,239 | 6 | 1,775 | 0 | 0 | 0 | 50 | 85 | 314 | 894 | MI | MI |
| KHANU WALI_1 | 604,222 | 328,787 | 275,435 | 14 | 3,357 | 0 | 0 | 0 | 22 | 0 | 61 | 2,005 | MI | MI |
| MARI SHEIKH SHIJRA | 29,737 | 15,530 | 14,206 | 11 | 4,492 | 0 | 0 | 0 | 2 | 26 | 161 | 3,440 | SE | MO |
| MIANI | 38,432 | 20,101 | 18,331 | 34 | 11,624 | 0 | 0 | 0 | 0 | 15 | 2,217 | 5,594 | MI | MI |
| RAMAN_1 | 15,408 | 8,208 | 7,199 | 3 | 204 | 0 | 0 | 0 | 10 | 0 | 0 | 97 | MI | MI |
| SANJAR | 34,614 | 17,914 | 16,701 | 10 | 3,617 | 34 | 0 | 0 | 0 | 0 | 1 | 2,664 | MI | MI |
| WAHI HUSSAIN | 29,970 | 15,526 | 14,444 | 9 | 3,881 | 0 | 0 | 0 | 0 | 18 | 379 | 22,842 | SE | MI |
| BAHAWALPUR CITY | | | | | | | | | | | | | | |
| CHAK NO 012/B C | 5,933 | 3,175 | 2,758 | 4 | 464 | 0 | 0 | 0 | 0 | 0 | 5 | 235 | SE | MO |
| JAMRANI KOHNA | 23,378 | 12,120 | 11,258 | 6 | 3,402 | 259 | 0 | 0 | 0 | 0 | 19 | 2,604 | MI | MI |
| JHANGI WALI JAMRANI | 2,962 | 1,556 | 1,406 | 2 | 790 | 0 | 0 | 0 | 0 | 0 | 0 | 594 | MO | MO |
| KHANU WALI | 93,451 | 49,074 | 44,377 | 32 | 11,868 | 527 | 0 | 21 | 0 | 20 | 409 | 8,230 | MI | MI |
| RAMAN | 13,194 | 6,763 | 6,431 | 17 | 2,425 | 0 | 0 | 0 | 0 | 14 | 67 | 1,525 | MI | MI |
| HASILPUR | | | | | | | | | | | | | | |
| HASILPUR_1 | 0 | 0 | 0 | 2 | 6,307 | 0 | 0 | 0 | 1 | 0 | 0 | 3,659 | MI | MI |
| CHAK NO 058/FORD | 29,037 | 14,798 | 14,239 | 2 | 6,335 | 0 | 0 | 0 | 33 | 47 | 1 | 4,697 | EX | SE |
| CHAK NO 079/FATEH | 35,647 | 18,028 | 17,619 | 1 | 3,328 | 0 | 0 | 0 | 0 | 0 | 0 | 1,896 | SE | MO |
| CHAK NO 163 MURAD | 36,036 | 18,497 | 17,539 | 0 | 5,102 | 0 | 0 | 0 | 19 | 0 | 0 | 2,949 | MI | MI |
| CHAK NO 163MURAD | 5,504 | 2,897 | 2,607 | 0 | 438 | 0 | 0 | 0 | 0 | 0 | 0 | 258 | MI | MI |
| CHAK NO 188/MURAD | 40,909 | 20,959 | 19,949 | 1 | 4,926 | 0 | 0 | 0 | 4 | 0 | 0 | 3,748 | SE | SE |
| CHAK NO 192/MURAD | 29,450 | 15,179 | 14,271 | 1 | 1,790 | 0 | 0 | 0 | 0 | 0 | 0 | 596 | SE | SE |
| CHAK NO 59 FATEH | 33,849 | 17,260 | 16,588 | 4 | 4,236 | 2 | 0 | 0 | 0 | 0 | 0 | 2,674 | EX | EX |
| HASIL PUR MANDI | 8,673 | 4,483 | 4,190 | 3 | 746 | 0 | 0 | 0 | 0 | 45 | 0 | 516 | EX | SE |
| HASIL PUR OLD | 161,280 | 82,951 | 78,329 | 9 | 5,655 | 0 | 0 | 0 | 19 | 442 | 60 | 3,515 | SE | SE |
| JAM PUR | 6,645 | 3,573 | 3,071 | 1 | 448 | 0 | 0 | 0 | 0 | 0 | 0 | 259 | MI | MI |
| JAMAL PUR | 35,262 | 18,360 | 16,902 | 11 | 8,436 | 27 | 0 | 0 | 0 | 190 | 36 | 4,425 | MI | MI |
| PALLAH | 38,512 | 20,137 | 18,376 | 9 | 10,557 | 79 | 0 | 0 | 0 | 859 | 48 | 5,382 | MI | MI |
| QAIM PUR | 37,435 | 19,455 | 17,979 | 12 | 4,375 | 0 | 0 | 0 | 0 | 186 | 8 | 2,672 | EX | SE |
| SHAH PUR | 23,751 | 12,268 | 11,483 | 11 | 5,310 | 0 | 0 | 0 | 0 | 317 | 31 | 3,108 | SE | SE |

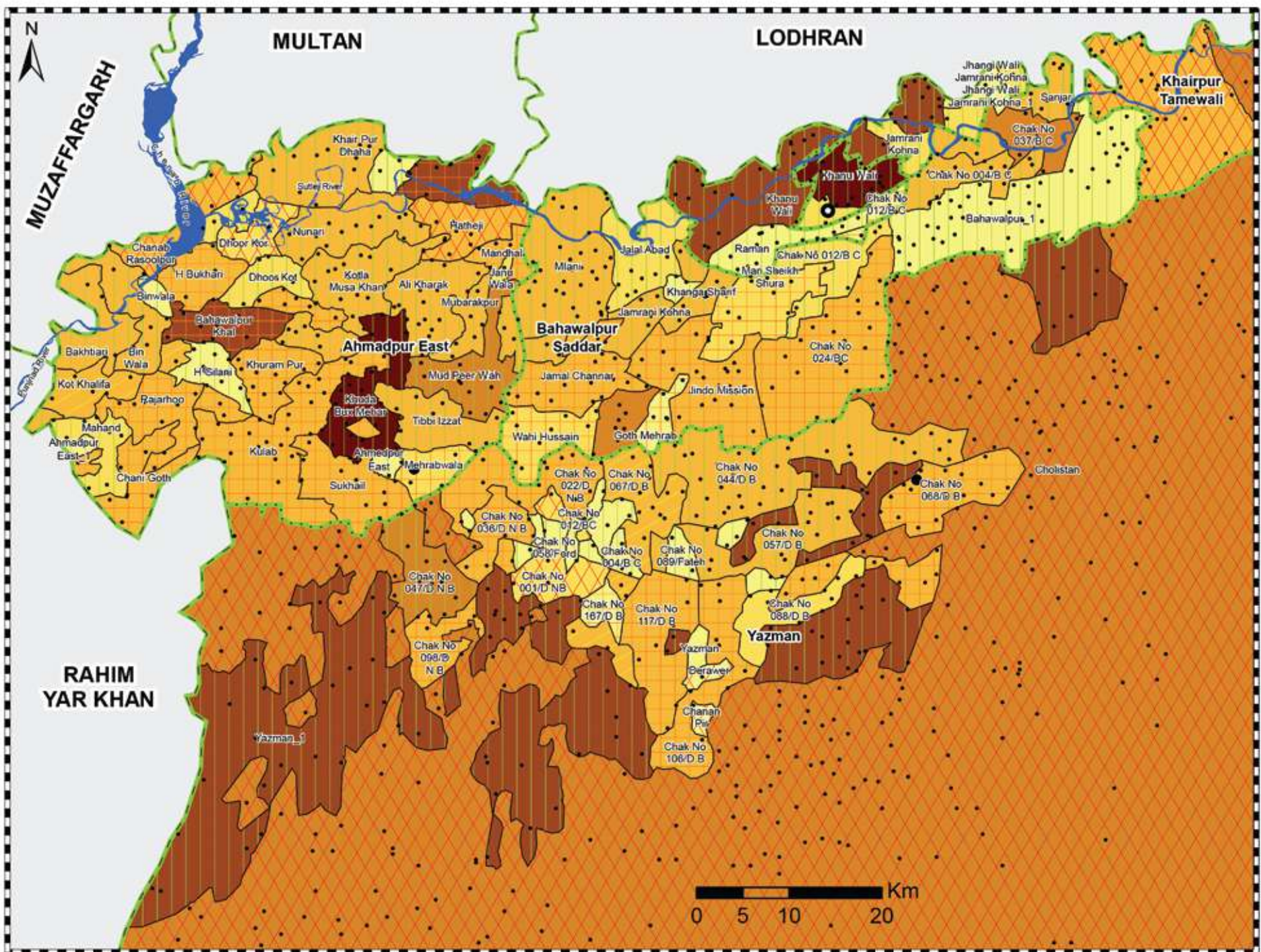
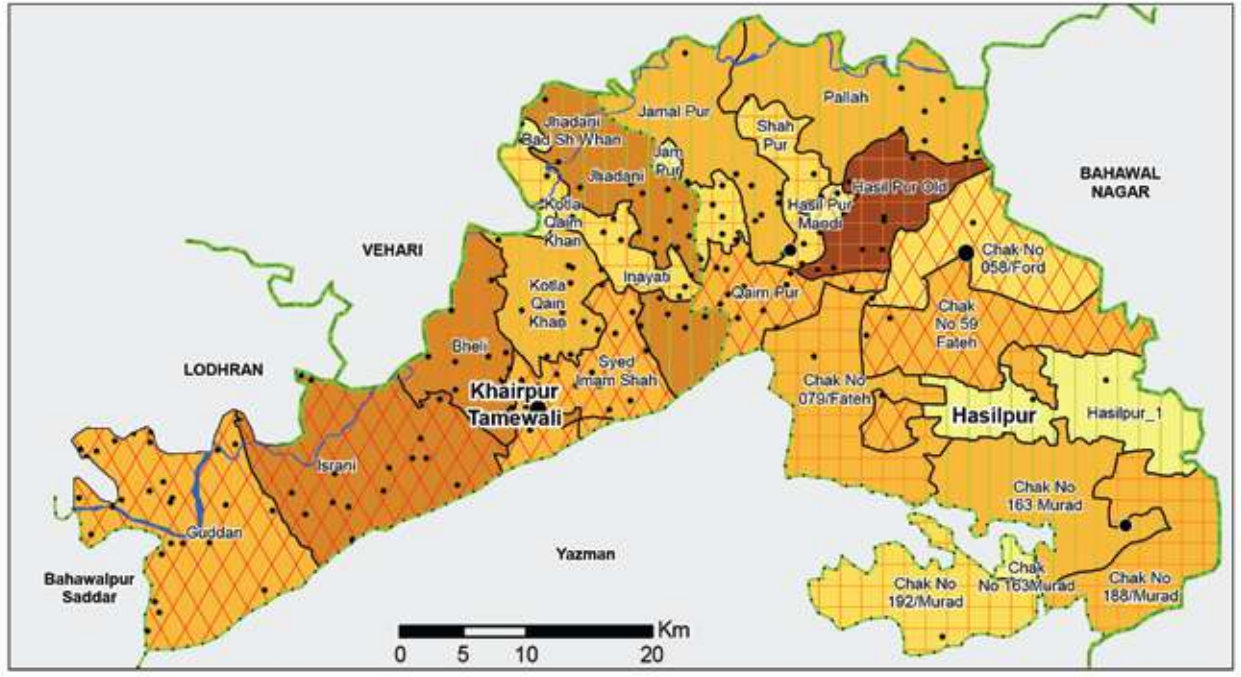
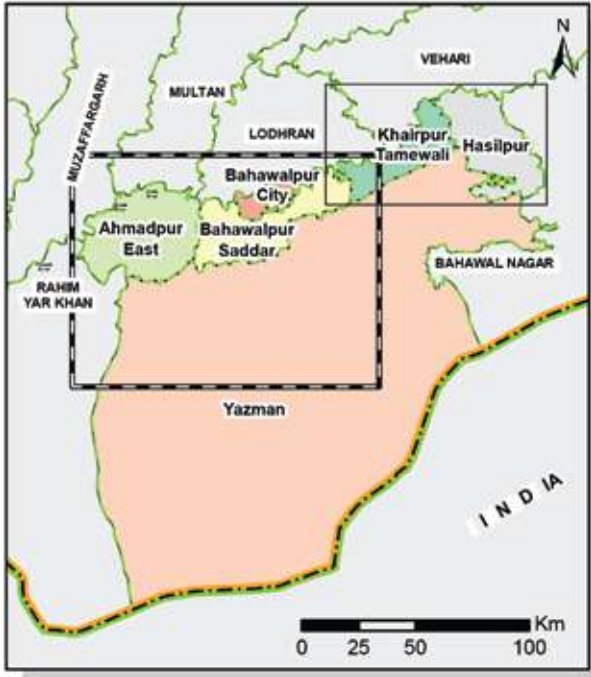
| UNION COUNCILS | DEMOGRAPHICS | | | SETTLEMENTS | LAND USE & LAND COVER TYPE (AREA IN HA) | | | | | AGRICULTURE CROPS (AREA IN HA) | | | DROUGHT PRONE | FREQUENTLY DROUGHT PRONE |
|--------------------------|------------------|------------------|------------------|--------------|---|---------------------|--------------|---------------|------------|--------------------------------|---------------|----------------|---------------|--------------------------|
| | POPULATION | MALE | FEMALE | | CROP IRRIGATED | CROP IN FLOOD PLAIN | CROP RAINFED | CROP MARGINAL | ORCHARDS | KHARIF CROP | | RABI CROP | | |
| | | | | | | | | | | RICE | SUGARCANE | WHEAT | | |
| KHAIRPUR TAMEWALI | | | | | | | | | | | | | | |
| BHELI | 77,664 | 40,455 | 37,210 | 11 | 6,338 | 20 | 0 | 0 | 2 | 14 | 0 | 3,396 | SE | SE |
| GUDDAN | 31,401 | 16,397 | 15,004 | 27 | 10,093 | 586 | 0 | 0 | 67 | 1 | 10 | 8,940 | EX | SE |
| INAYATI | 24,619 | 12,902 | 11,718 | 11 | 4,277 | 40 | 0 | 0 | 23 | 31 | 1 | 2,325 | SE | MO |
| ISRANI | 46,240 | 24,136 | 22,104 | 15 | 11,056 | 586 | 0 | 0 | 79 | 6 | 19 | 8,427 | EX | MI |
| JHADANI | 47,583 | 24,549 | 23,034 | 22 | 10,237 | 188 | 0 | 0 | 0 | 123 | 25 | 6,551 | MI | MI |
| JHADANI BAD SH.WHAN) | 545 | 278 | 268 | 1 | 309 | 0 | 0 | 0 | 3 | 9 | 1 | 127 | MI | MI |
| KOTLA QAIM KHAN | 3,842 | 2,026 | 1,816 | 0 | 259 | 15 | 0 | 0 | 0 | 1 | 0 | 121 | MI | MI |
| KOTLA QAIN KHAN | 32,749 | 16,852 | 15,896 | 12 | 6,364 | 0 | 0 | 0 | 0 | 85 | 1 | 4,374 | MI | MI |
| SYED IMAM SHAH | 33,971 | 17,552 | 16,419 | 17 | 5,777 | 0 | 0 | 0 | 10 | 12 | 1 | 4,079 | EX | SE |
| KHAIRPUR TAMEWALI | | | | | | | | | | | | | | |
| YAZMAN_1 | 177,713 | 93,209 | 84,505 | 90 | 31,043 | 0 | 0 | 0 | 0 | 58 | 707 | 19,026 | MI | MI |
| CHAK NO 001/D N B | 26,863 | 13,993 | 12,870 | 7 | 4,134 | 0 | 0 | 0 | 0 | 0 | 0 | 3,388 | EX | SE |
| CHAK NO 004/B C | 6,245 | 3,267 | 2,978 | 3 | 941 | 0 | 0 | 0 | 0 | 0 | 0 | 743 | MI | MI |
| CHAK NO 012/BC_2 | 13,089 | 6,640 | 6,449 | 3 | 1,819 | 0 | 0 | 0 | 0 | 0 | 19 | 2,367 | MI | MI |
| CHAK NO 017/D N B | 5,139 | 2,659 | 2,480 | 3 | 814 | 0 | 0 | 0 | 0 | 0 | 0 | 700 | MI | MI |
| CHAK NO 022/D N B | 44,219 | 22,809 | 21,410 | 15 | 5,137 | 0 | 0 | 0 | 0 | 4 | 37 | 3,998 | SE | MO |
| CHAK NO 024/BC_1 | 5,268 | 2,694 | 2,574 | 1 | 415 | 0 | 0 | 0 | 0 | 0 | 1 | 340 | MI | MI |
| CHAK NO 036/D N B | 33,659 | 17,710 | 15,949 | 6 | 2,908 | 0 | 0 | 0 | 0 | 0 | 0 | 2,182 | SE | MO |
| CHAK NO 037/B C_1 | 6,553 | 3,427 | 3,126 | 0 | 349 | 0 | 0 | 0 | 0 | 0 | 0 | 300 | MI | MI |
| CHAK NO 044/D B | 43,799 | 22,786 | 21,013 | 34 | 12,222 | 0 | 0 | 0 | 0 | 279 | 125 | 8,963 | MI | MI |
| CHAK NO 047/D N B | 51,197 | 26,567 | 24,630 | 11 | 5,387 | 0 | 0 | 0 | 0 | 33 | 0 | 4,293 | MI | MI |
| CHAK NO 057/D B | 33,596 | 17,400 | 16,196 | 16 | 7,370 | 0 | 0 | 0 | 0 | 123 | 31 | 5,559 | MI | MI |
| CHAK NO 058/FORD_1 | 9,416 | 4,841 | 4,575 | 3 | 1,212 | 0 | 0 | 0 | 0 | 0 | 0 | 1,002 | MI | MI |
| CHAK NO 067/D B | 31,156 | 16,449 | 14,707 | 16 | 6,015 | 0 | 0 | 0 | 0 | 21 | 39 | 4,042 | MO | MI |
| CHAK NO 068/D B | 38,989 | 20,412 | 18,577 | 24 | 6,800 | 0 | 0 | 0 | 0 | 184 | 4 | 5,060 | SE | MO |
| CHAK NO 088/D B | 27,293 | 14,305 | 12,988 | 9 | 2,328 | 0 | 0 | 0 | 0 | 0 | 0 | 1,830 | MO | MO |
| CHAK NO 089/FATEH | 7,041 | 3,527 | 3,514 | 6 | 1,689 | 0 | 0 | 0 | 0 | 0 | 3 | 1,344 | MI | MI |
| CHAK NO 098/D N B | 40,748 | 21,179 | 19,570 | 9 | 3,835 | 0 | 0 | 0 | 0 | 0 | 2 | 2,907 | SE | MI |
| CHAK NO 106/D B | 38,563 | 20,033 | 18,530 | 9 | 3,732 | 0 | 0 | 0 | 0 | 0 | 0 | 2,844 | SE | MI |
| CHAK NO 117/D B | 41,144 | 21,471 | 19,672 | 7 | 5,323 | 0 | 0 | 0 | 0 | 0 | 0 | 3,968 | SE | MI |
| CHAK NO 167/D B | 8,694 | 4,629 | 4,065 | 0 | 563 | 0 | 0 | 0 | 0 | 0 | 0 | 349 | SE | MI |
| CHANAN PIR | 1,891 | 987 | 904 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | EX | EX |
| CHOLISTAN | 52,190 | 27,231 | 24,960 | 436 | 77,425 | 0 | 36 | 35 | 65 | 387 | 1,372 | 51,315 | EX | EX |
| DERAWER | 4,347 | 2,186 | 2,161 | 1 | 376 | 0 | 0 | 0 | 0 | 0 | 0 | 260 | EX | EX |
| YAZMAN | 3,084 | 1,553 | 1,531 | 0 | 548 | 0 | 0 | 0 | 0 | 0 | 0 | 437 | MO | MO |
| DISTRICT TOTAL: | 3,989,778 | 2,093,775 | 1,896,006 | 1,510 | 543,930 | 6,368 | 36 | 485 | 534 | 4,305 | 13,158 | 390,223 | | |

LEGEND: **NO** NO DROUGHT **MI** MILD DROUGHT **MO** MODERATE DROUGHT **SE** SEVERE DROUGHT **EX** EXTREME DROUGHT

Elements at Risk According to Drought Severity

| ELEMENTS AT RISK | DROUGHT PRONE | | | | | FREQUENTLY DROUGHT PRONE | | | | |
|---------------------|---------------|-----------|---------|-----------|----|--------------------------|---------|---------|-----------|----|
| | EX | SE | MO | MI | NO | EX | SE | MO | MI | NO |
| Population | 407,070 | 1,238,919 | 102,872 | 2,240,917 | 0 | 133,769 | 614,845 | 351,587 | 2,889,577 | 0 |
| Settlements | 546 | 326 | 33 | 605 | 0 | 452 | 139 | 136 | 783 | 0 |
| Crop Irrigated | 133,899 | 146,632 | 13,875 | 249,524 | 0 | 84,711 | 72,100 | 53,192 | 333,927 | 0 |
| Crop in Flood Plain | 2,745 | 750 | 0 | 2,873 | 0 | 994 | 607 | 128 | 4,639 | 0 |
| Crop Rainfed | 36 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 0 |
| Crop Marginal | 35 | 48 | 0 | 402 | 0 | 35 | 0 | 1 | 449 | 0 |
| Orchards | 255 | 96,68 | 0 | 182 | 0 | 65 | 136 | 57 | 276 | 0 |
| Rice | 684 | 1,372 | 56 | 2,193 | 0 | 387 | 1,301 | 292 | 2,326 | 0 |
| Sugarcane | 1,797 | 3,660 | 126 | 7,576 | 0 | 1,381 | 707 | 949 | 10,122 | 0 |
| Wheat | 94,331 | 120,648 | 9,615 | 165,630 | 0 | 56,798 | 506 | 37,339 | 245,497 | 0 |

SETTLEMENTS, VILLAGES, MAJOR TOWNS AND POPULATION EXPOSED TO DROUGHT



Legend

- District Headquarter
- Tehsil Headquarter
- Major Towns
- Settlements / Villages

Population Distribution

| | |
|-----|----------------|
| Abc | <= 15000 |
| Abc | 15001 - 30000 |
| Abc | 30001 - 45000 |
| Abc | 45001 - 90000 |
| Abc | 90001 - 180000 |
| Abc | > 180000 |

Drought Prone Union Council

| | |
|----------------|--------------|
| [White] | No Drought |
| [Light Yellow] | Mild Drought |
| [Yellow] | Moderate |
| [Orange] | Severe |
| [Dark Orange] | Extreme |

Other Features

- [Blue]
- [Blue]
- Abc Tehsil Boundary
- ABC District Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

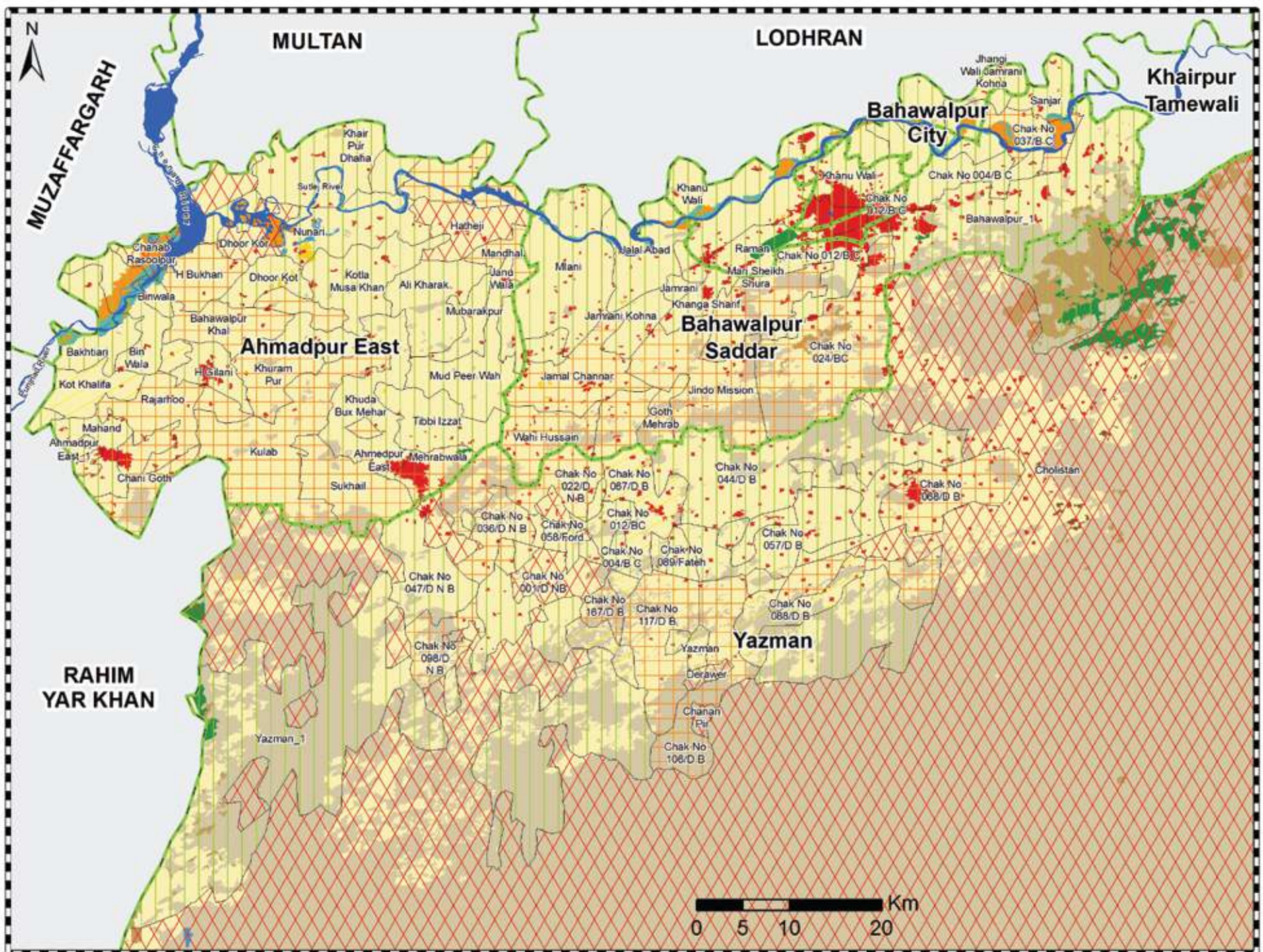
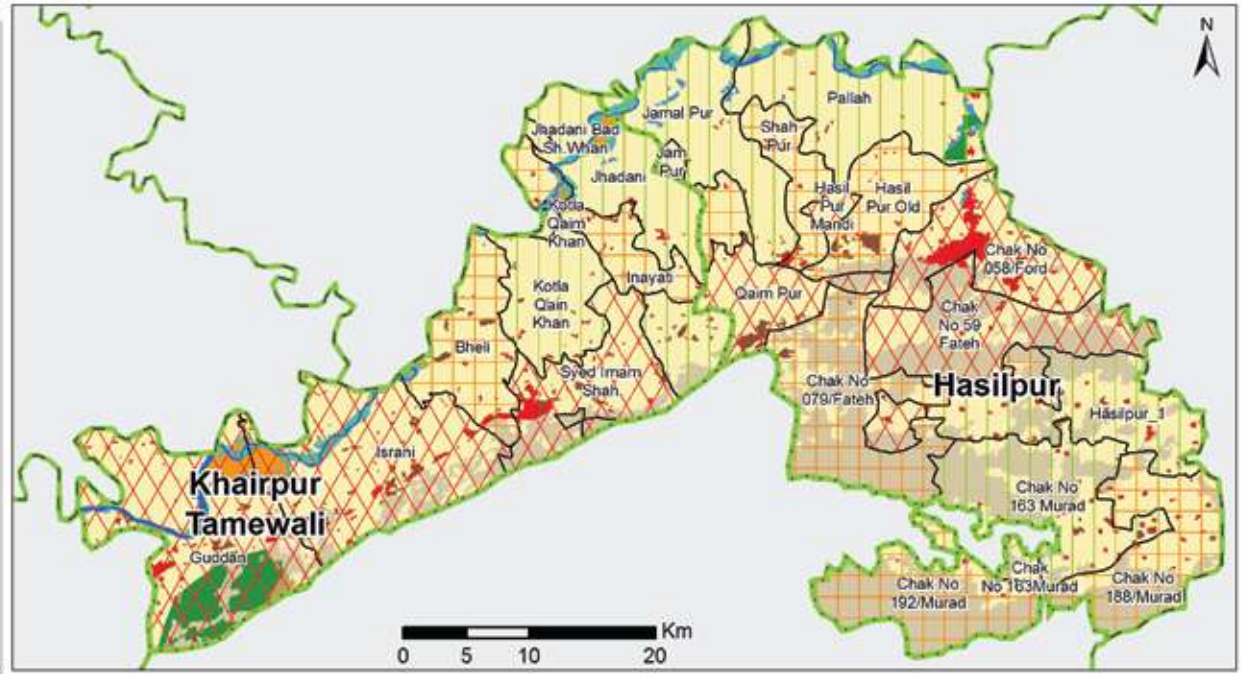
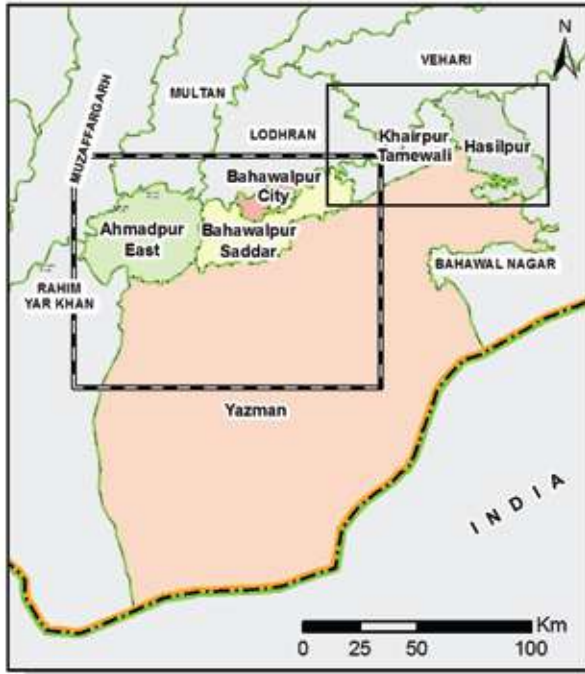
MAP INFORMATION

Data Source(s):
Pakistan Meteorological Department
Survey of Pakistan

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-02-NDMA-DP-C(POP-SET)
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

LAND USE & LAND COVER EXPOSED TO DROUGHT



Legend

| | | |
|---|------------------------|-----------------------------|
| Bare Areas | River and Water Body | Drought Prone Union Council |
| Bare Areas with Sparse Natural Vegetation | Union Council Boundary | No Drought |
| Built-up | Tehsil Boundary | Mild |
| Crop in Flood Plain | District Boundary | Moderate |
| Crop Marginal and Irrigated Saline | Provincial Boundary | Severe |
| Crop Rainfed | Line of Control | Extreme |
| Crop Irrigated | International Boundary | |
| Forest - Natural Trees and Mangroves | | |
| Natural Vegetation in Wet Areas | | |
| Orchards | | |
| Range Lands - Natural Shrubs and Herbs | | |
| Snow and Glaciers | | |
| Wet Areas | | |

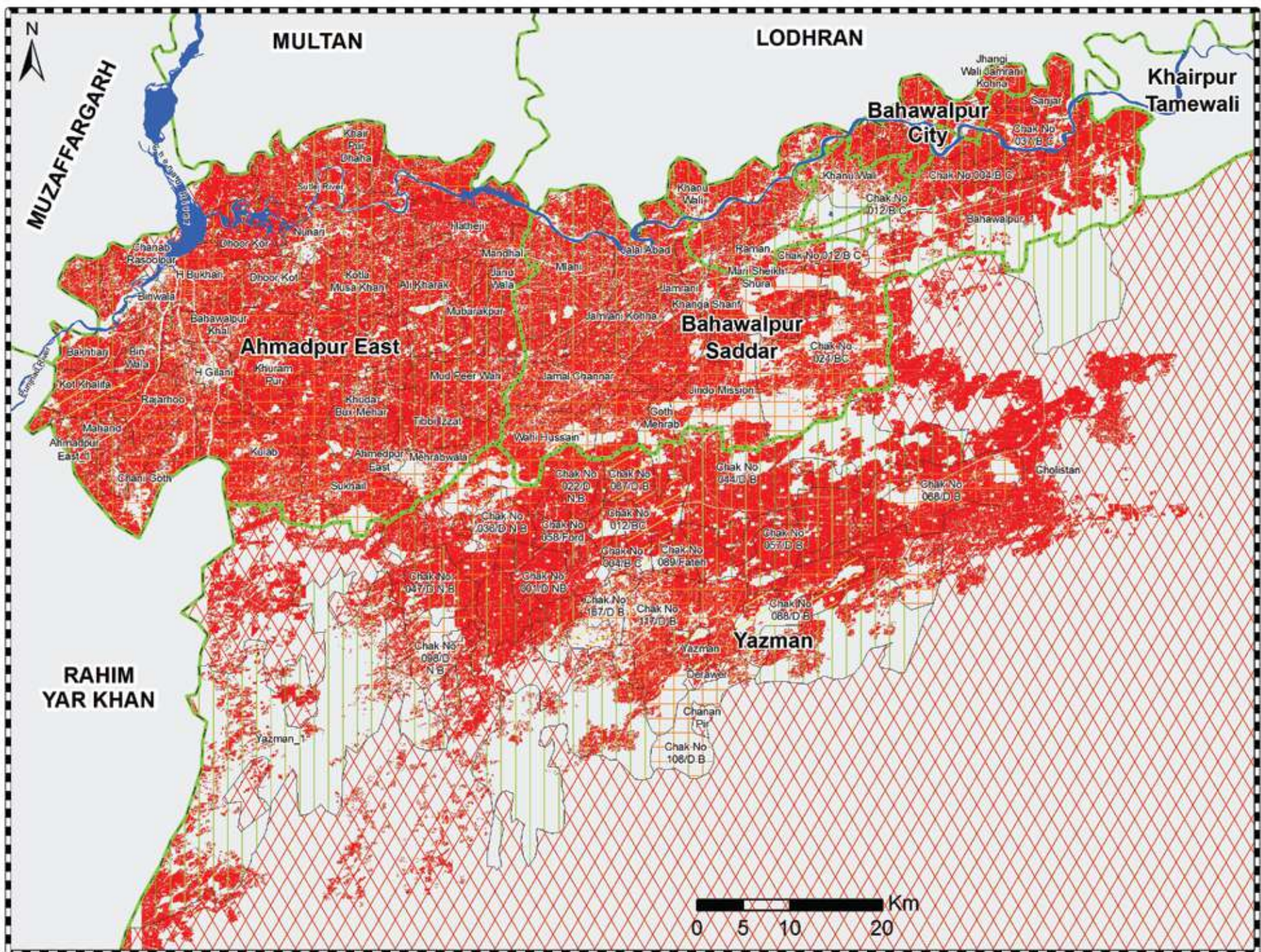
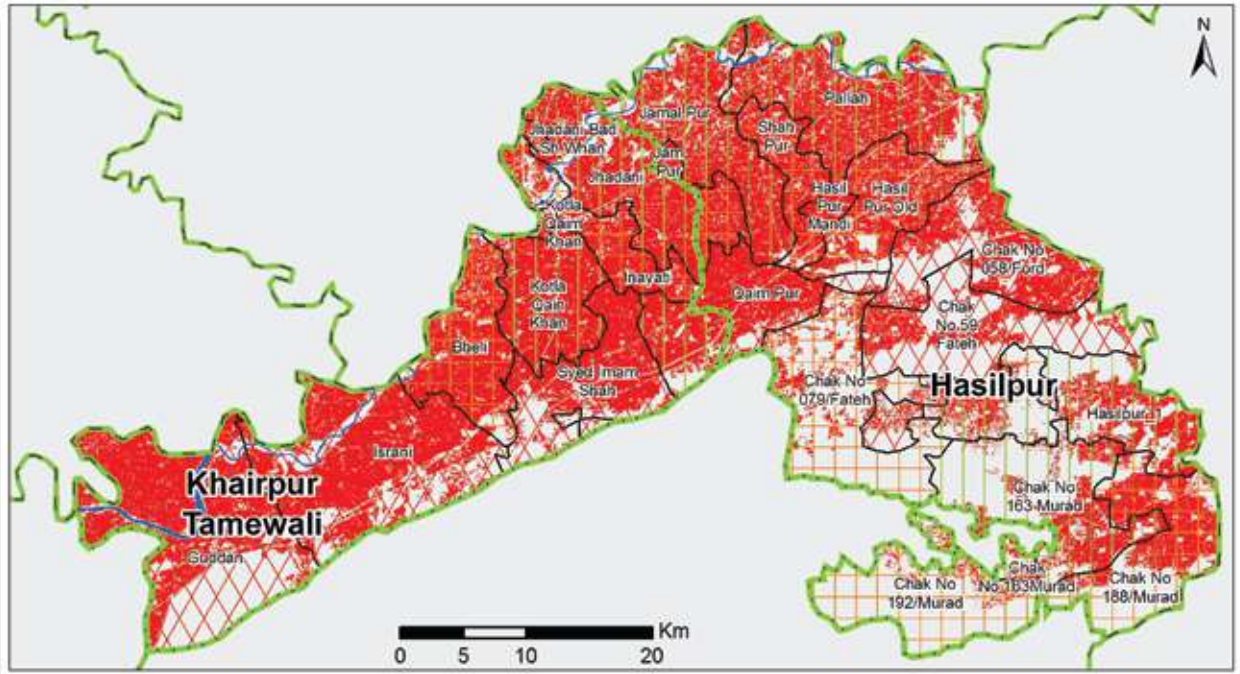
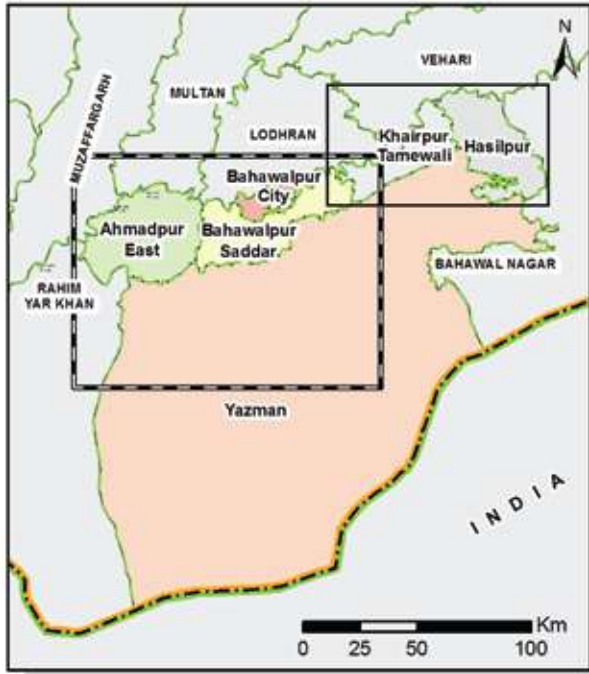
Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
PBS, Govt. of Punjab, Govt. of Pakistan
Hazard Layer-NDMA, Landcover-SUPARCO

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-603-APR-2016-EXP-02-NDMA-DP-LULC
Prepared by: Project Management Unit, NDMA
Last Updated: 22th June, 2017

CROP EXPOSED TO DROUGHT (RABI SEASON)



Legend

| | | |
|------------------------|------------------------|------------------------------------|
| Wheat | River and Water Body | Drought Prone Union Council |
| Union Council Boundary | Tehsil Boundary | No Drought |
| District Boundary | Provincial Boundary | Mild |
| Line of Control | International Boundary | Moderate |
| | | Severe |
| | | Extreme |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

United Nations World Food Programme

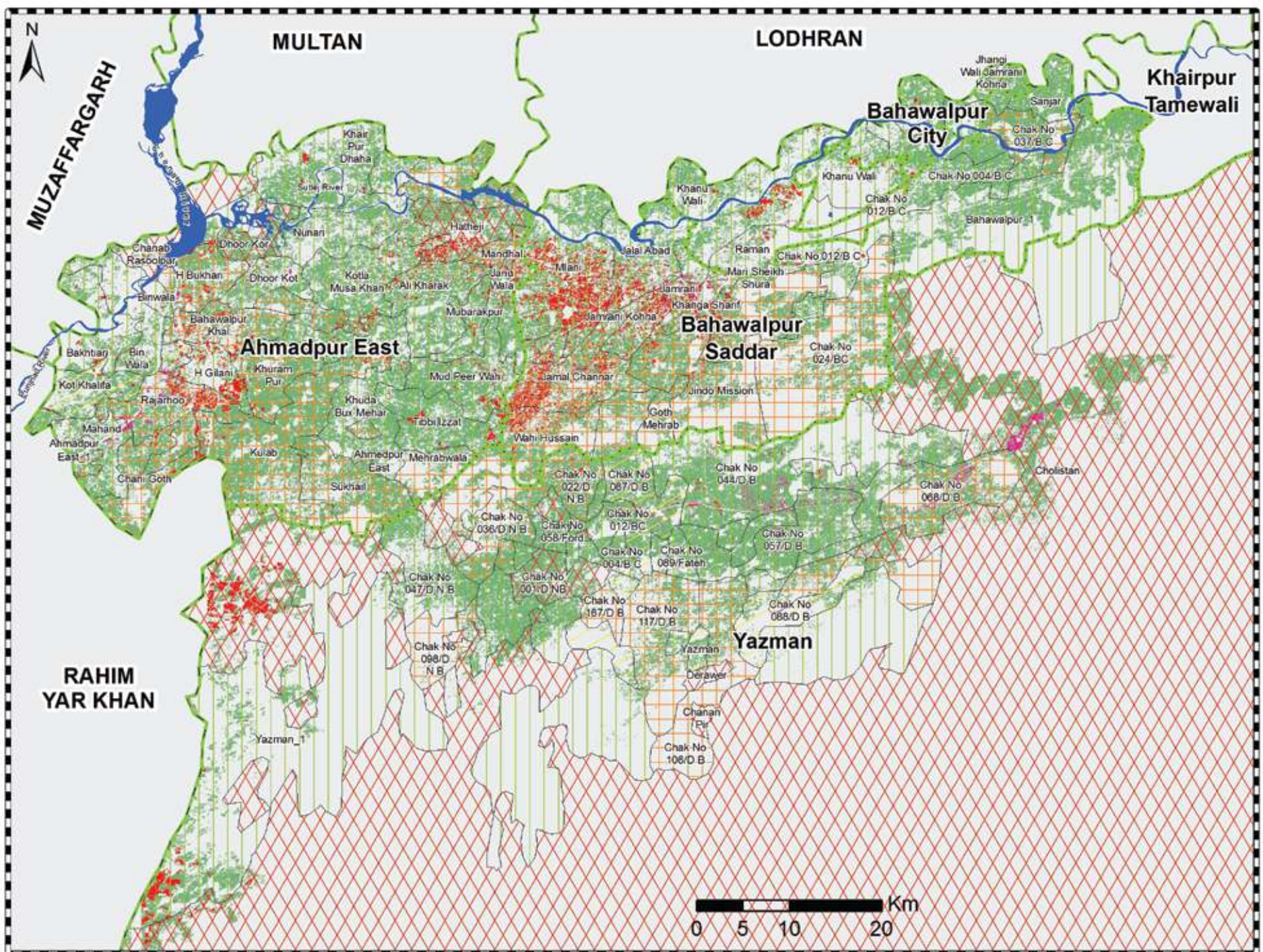
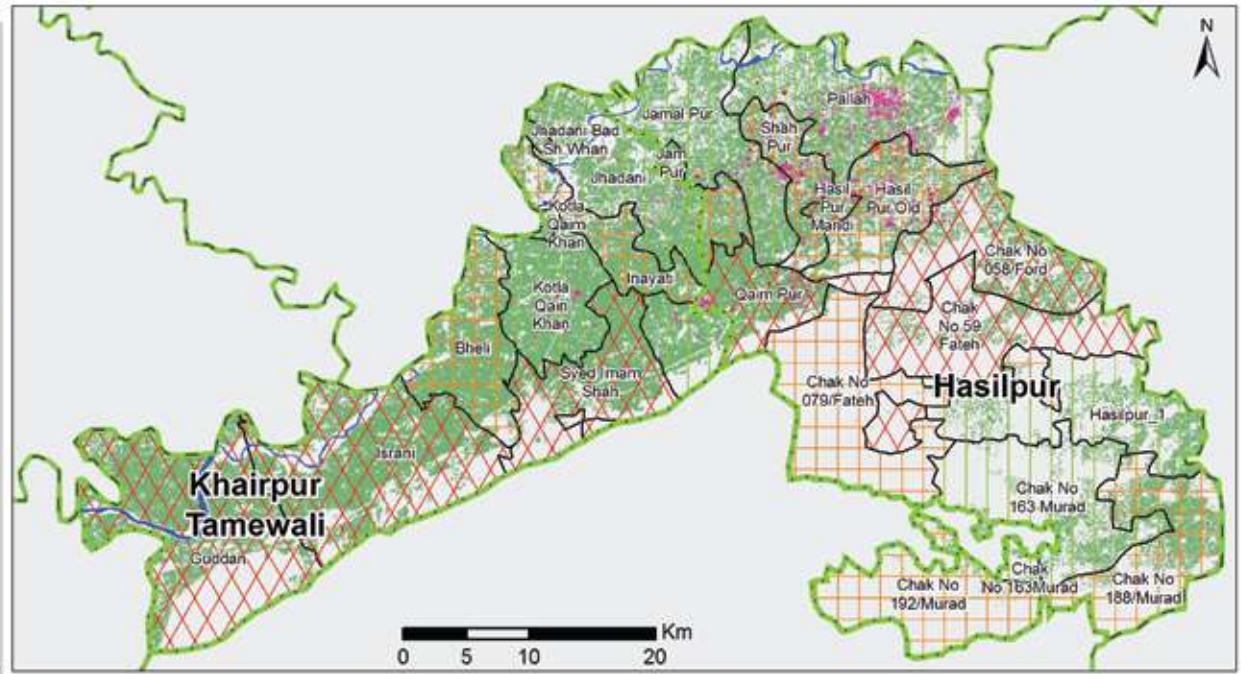
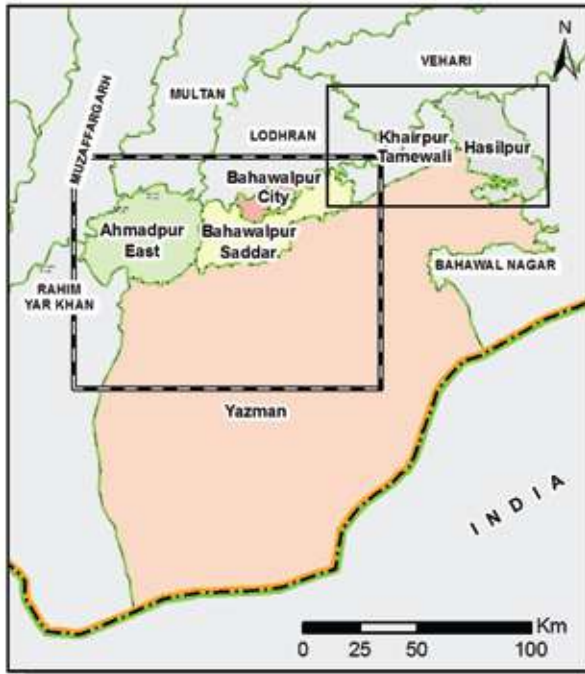
MAP INFORMATION

Data Source(s):
PBS, Govt. of Punjab, Govt. of Pakistan
Hazard Layer-NDMA, Crop Mask-SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-02-NDMA-DP-RB-CROPS
Prepared by: Project Management Unit, NDMA
Last Updated: 22th June, 2017

CROP EXPOSED TO DROUGHT (KHARIF SEASON)



Legend

| | | |
|-----------|------------------------|------------------------------------|
| Rice | River and Water Body | Drought Prone Union Council |
| Sugarcane | Union Council Boundary | No Drought |
| Cotton | Tehsil Boundary | Mild |
| | District Boundary | Moderate |
| | Provincial Boundary | Severe |
| | Line of Control | Extreme |
| | International Boundary | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
PBS, Govt. of Punjab, Govt. of Pakistan
Hazard Layer-NDMA, Crop Mask-SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-02-NDMA-DP-KH-CROPS
Prepared by: Project Management Unit, NDMA
Last Updated: 22th June, 2017

UNION COUNCILS

- AHMADPUR EAST_1
- AHMEDPUR EAST
- ALI KHARAK
- BAHAWALPUR KHALWAN
- BAKHTIARI
- BIN WALA
- BINWALA
- CHANAB RASOOLPUR
- CHANI GOTH
- DHOOR KOR
- DHOOR KOT
- H BUKHARI
- H GILANI
- HATHEJI
- JANU WALA
- KHAIR PUR DHAHA
- KHUDA BUX MEHAR
- KHURAM PUR
- KOT KHALIFA
- KOTLA MUSA KHAN
- KULAB
- MAHAND
- MANDHAL
- MEHRABWALA
- MUBARAKPUR
- MUD PEER WAH
- NUNARI
- RAJARHOO
- SUKHAIL
- TIBBI IZZAT

AHMADPUR EAST

YAZMAN

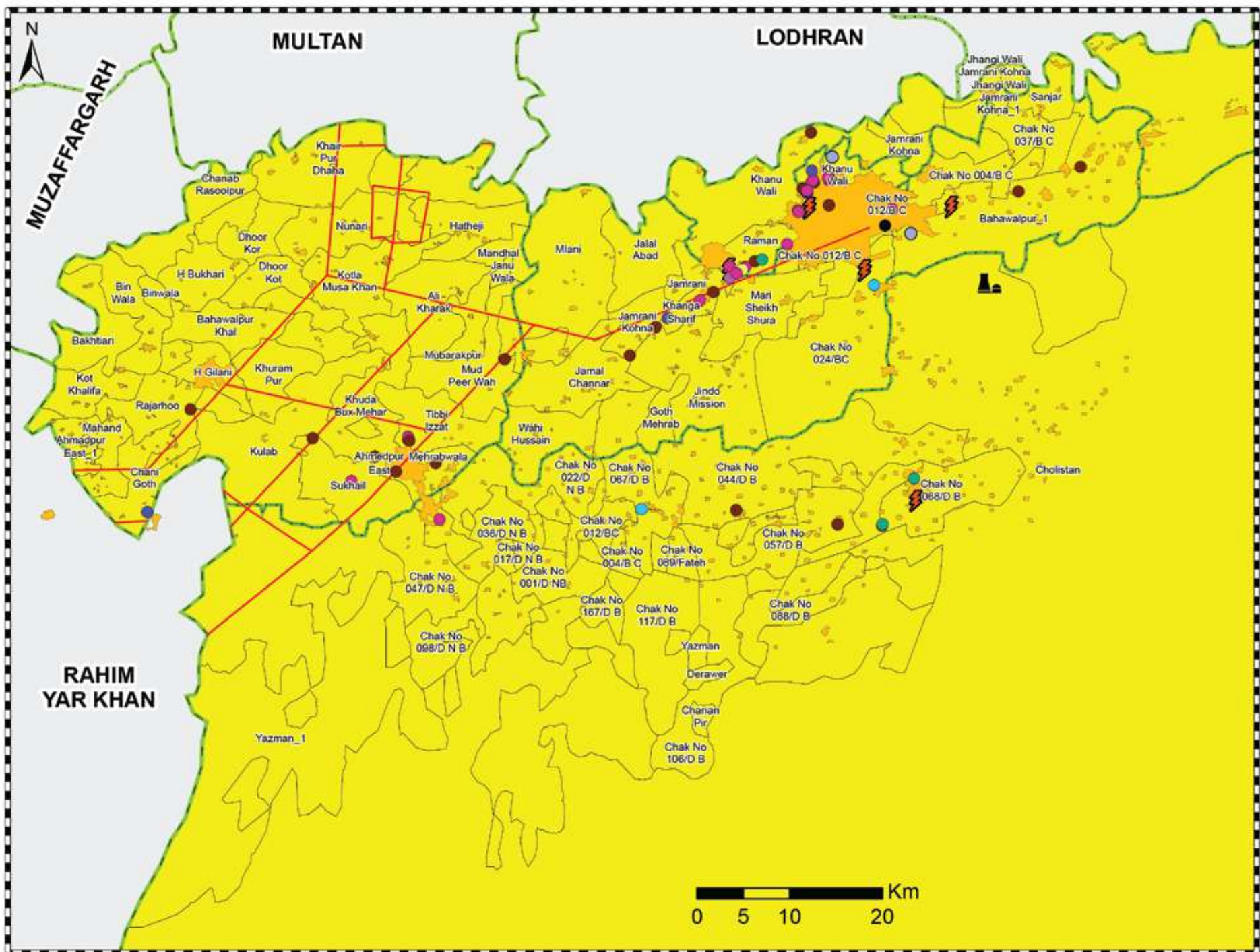
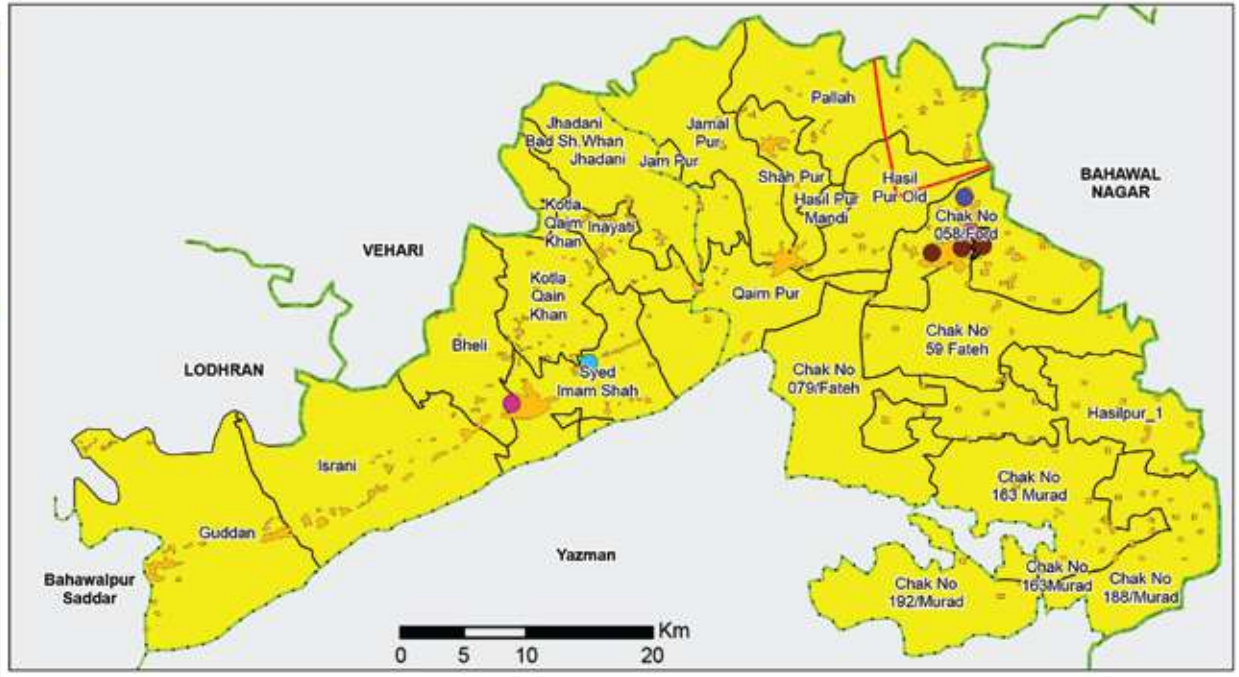
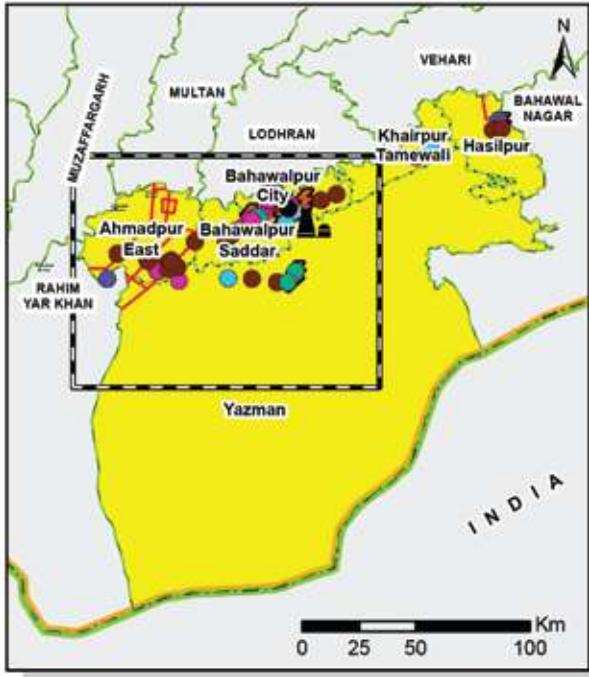
BAHAWALPUR CITY

| UNION COUNCILS | TRANSPORTATION & INFRASTRUCTURE | | | | | | | | | | | | EDUCATION FACILITIES | | | | | | | | | | | | CRITICAL INFRASTRUCTURE | | | | | | | | | | | | | | | |
|----------------------|---------------------------------|---------|--------|--------|---------------------------------|---------|--------|--------|---------------------------------------|---------|--------|--------|----------------------|---------|--------|--------|---------|---------|--------|--------|--------|---------|--------|--------|-------------------------|---------|--------|--------|--------------------|---------|--------|--------|----------------------------|---------|--------|--------|-------|---|---|---|
| | MOTORWAY & HIGHWAY (km) | | | | SECONDARY ROADS (METALLED) (km) | | | | UNMETALLED ROAD/CART TRACK/PACK TRACK | | | | RAILWAY TRACK (km) | | | | SCHOOLS | | | | BOYS | | | | GIRLS | | | | NUMBER OF TEACHERS | | | | SINGPL (GAS PIPELINE) (km) | | | | OTHER | | | |
| | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | | | | |
| AHMADPUR EAST_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 322 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| AHMEDPUR EAST | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 446 | 0 | 0 | 0 | 402 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ALI KHARAK | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 1,053 | 0 | 0 | 0 | 681 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BAHAWALPUR KHALWAN | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 1,042 | 0 | 0 | 0 | 613 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BAKHTIARI | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BIN WALA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 1,119 | 0 | 0 | 0 | 610 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BINWALA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 170 | 0 | 0 | 0 | 75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHANAB RASOOLPUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHANI GOTH | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 1,483 | 0 | 0 | 0 | 932 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DHOOR KOR | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 425 | 0 | 0 | 0 | 313 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DHOOR KOT | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 746 | 0 | 0 | 0 | 281 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| H BUKHARI | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 299 | 0 | 0 | 0 | 108 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| H GILANI | 0 | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 1,580 | 0 | 0 | 0 | 1,384 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HATHEJI | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 640 | 0 | 0 | 0 | 260 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JANU WALA | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 539 | 0 | 0 | 0 | 285 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KHAIR PUR DHAHA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 111 | 0 | 0 | 0 | 66 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KHUDA BUX MEHAR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 2,056 | 0 | 0 | 0 | 767 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 101 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KHURAM PUR | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 1,518 | 0 | 0 | 0 | 1,032 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 86 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KOT KHALIFA | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 564 | 0 | 0 | 0 | 847 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 43 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KOTLA MUSA KHAN | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 1,109 | 0 | 0 | 0 | 896 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KULAB | 0 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 1,405 | 0 | 0 | 0 | 1,267 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 93 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MAHAND | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 1,277 | 0 | 0 | 0 | 716 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 84 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MANDHAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 885 | 0 | 0 | 0 | 162 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MEHRABWALA | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 3,285 | 0 | 0 | 0 | 2,213 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 228 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MUBARAKPUR | 0 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 1,073 | 0 | 0 | 0 | 1,030 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 79 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MUD PEER WAH | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 1,079 | 0 | 0 | 0 | 576 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NUNARI | 0 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 905 | 0 | 0 | 0 | 569 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| RAJARHOO | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 21 | 0 | 0 | 0 | 1,539 | 0 | 0 | 0 | 1,111 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SUKHAIL | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 1,719 | 0 | 0 | 0 | 1,012 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 93 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TIBBI IZZAT | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 1,115 | 0 | 0 | 0 | 1,139 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 79 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TEHSIL TOTAL: | 0 | 0 | 0 | 0 | 315 | 0 | 0 | 0 | 144 | 0 | 0 | 0 | 463 | 0 | 0 | 0 | 29,454 | 0 | 0 | 0 | 19,356 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,701 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BAHAWALPUR_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 0 | 0 | 0 | 4,690 | 0 | 0 | 0 | 4,318 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 337 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 004/BC_1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 1,653 | 0 | 0 | 0 | 1,314 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 96 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 012/BC_1 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 1,019 | 0 | 0 | 0 | 2,502 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 134 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 024/BC | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 31 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 2,615 | 0 | 0 | 0 | 2,209 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 037/BC | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 1,414 | 0 | 0 | 0 | 1,289 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 109 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GOTH MEHRAB | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 298 | 0 | 0 | 0 | 175 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JALALABAD | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 1,007 | 0 | 0 | 0 | 354 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JAMAL CHANNAR | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 47 | 0 | 0 | 0 | 2,985 | 0 | 0 | 0 | 2,996 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 208 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JAMRANI | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 203 | 0 | 0 | 0 | 278 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JAMRANI KOHNA_1 | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 1,247 | 0 | 0 | 0 | 1,670 | 0 | 0 | | | | | | | | | | | | | | | | | |



| UNION COUNCILS | TRANSPORTATION & INFRASTRUCTURE | | | | | | | | | | | | EDUCATION FACILITIES | | | | | | | | | | | | CRITICAL INFRASTRUCTURE | | | | | | | | | | | | | | | |
|----------------------|---------------------------------|---------|--------|--------|---------------------------------|---------|--------|--------|---------------------------------------|---------|--------|--------|----------------------|---------|--------|--------|---------|---------|--------|--------|--------|---------|--------|--------|-------------------------|---------|--------|--------|--------------------|---------|--------|--------|----------------------------|---------|--------|--------|-------|---|---|---|
| | MOTORWAY & HIGHWAY (km) | | | | SECONDARY ROADS (METALLED) (km) | | | | UNMETALLED ROAD/CART TRACK/PACK TRACK | | | | RAILWAY TRACK (km) | | | | SCHOOLS | | | | BOYS | | | | GIRLS | | | | NUMBER OF TEACHERS | | | | SINGPL (GAS PIPELINE) (km) | | | | OTHER | | | |
| | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | Zone 1 | Zone 2A | Zone 3 | Zone 4 | | | | |
| HASILPUR_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 | 1,994 | 0 | 0 | 0 | 1,634 | 0 | 0 | 0 | 183 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 058/FORD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 61 | 0 | 0 | 0 | 6,417 | 0 | 0 | 0 | 6,003 | 0 | 0 | 0 | 558 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 079/FATEH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 181 | 0 | 0 | 0 | 183 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 96 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 163 MURAD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 1,087 | 0 | 0 | 0 | 1,331 | 0 | 0 | 0 | 96 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 163MURAD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 156 | 0 | 0 | 0 | 101 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 188/MURAD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 1,846 | 0 | 0 | 0 | 529 | 0 | 0 | 0 | 101 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 192/MURAD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 236 | 0 | 0 | 0 | 13 | 0 | 0 | 0 | 125 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 59 FATEH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 1,082 | 0 | 0 | 0 | 1,176 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HASIL PUR MANDI | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 199 | 0 | 0 | 0 | 46 | 0 | 0 | 0 | 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HASIL PUR OLD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 888 | 0 | 0 | 0 | 793 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JAM PUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JAMAL PUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JAMAL PUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 409 | 0 | 0 | 0 | 1,194 | 0 | 0 | 0 | 48 | 0 | 0 | 0 | 132 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PALLAH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 2,227 | 0 | 0 | 0 | 1,441 | 0 | 0 | 0 | 45 | 0 | 0 | 0 | 87 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| QAIM PUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 885 | 0 | 0 | 0 | 318 | 0 | 0 | 0 | 87 | 0 | 0 | 0 | 151 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SHAH PUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 1,862 | 0 | 0 | 0 | 549 | 0 | 0 | 0 | 87 | 0 | 0 | 0 | 1495 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TEHSIL TOTAL: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 254 | 0 | 0 | 0 | 283 | 0 | 0 | 0 | 19,286 | 0 | 0 | 0 | 15,989 | 0 | 0 | 0 | 1,495 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| BHELI | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 694 | 0 | 0 | 0 | 807 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| GUDDAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 2,602 | 0 | 0 | 0 | 1,928 | 0 | 0 | 0 | 127 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| INAYATI | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 717 | 0 | 0 | 0 | 273 | 0 | 0 | 0 | 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ISRANI | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 1,996 | 0 | 0 | 0 | 1,550 | 0 | 0 | 0 | 125 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JHADANI | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 1,293 | 0 | 0 | 0 | 830 | 0 | 0 | 0 | 68 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JHADANI BAD SH.WHAN) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KOTLA QAIM KHAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KOTLA QAIM KHAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 1,480 | 0 | 0 | 0 | 821 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SYED IMAM SHAH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 2,527 | 0 | 0 | 0 | 2,408 | 0 | 0 | 0 | 151 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TEHSIL TOTAL: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 114 | 0 | 0 | 0 | 44 | 0 | 0 | 0 | 11,309 | 0 | 0 | 0 | 8,617 | 0 | 0 | 0 | 644 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| YAZMAN_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 65 | 0 | 0 | 0 | 4,289 | 0 | 0 | 0 | 2,827 | 0 | 0 | 0 | 341 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 001/D N B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 736 | 0 | 0 | 0 | 548 | 0 | 0 | 0 | 59 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 004/B C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 188 | 0 | 0 | 0 | 120 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 012/BC_2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 395 | 0 | 0 | 0 | 274 | 0 | 0 | 0 | 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 017/D N B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 149 | 0 | 0 | 0 | 57 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 022/D N B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 0 | 0 | 0 | 26 | 0 | 0 | 0 | 1,589 | 0 | 0 | 0 | 1,103 | 0 | 0 | 0 | 108 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 024/BC_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 107 | 0 | 0 | 0 | 132 | 0 | 0 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 036/D N B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 365 | 0 | 0 | 0 | 263 | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 037/B C_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 187 | 0 | 0 | 0 | 240 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 044/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 0 | 0 | 0 | 52 | 0 | 0 | 0 | 2,098 | 0 | 0 | 0 | 2,356 | 0 | 0 | 0 | 207 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 047/D N B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 16 | 0 | 0 | 0 | 1,349 | 0 | 0 | 0 | 1,012 | 0 | 0 | 0 | 90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 057/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 1,709 | 0 | 0 | 0 | 1,542 | 0 | 0 | 0 | 144 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 058/FORD_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 326 | 0 | 0 | 0 | 167 | 0 | 0 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 067/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 2,081 | 0 | 0 | 0 | 1,193 | 0 | 0 | 0 | 140 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 068/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 0 | 0 | 0 | 35 | 0 | 0 | 0 | 2,472 | 0 | 0 | 0 | 2,428 | 0 | 0 | 0 | 256 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

BUILT UP, MAJOR INDUSTRIES & CRITICAL INFRASTRUCTURE EXPOSED TO EARTHQUAKE 475 YEAR RETURN PERIOD



Legend

- Marble Factory
- Cotton Factory
- Oil Industry
- Ice Factory
- Flour Mill
- Wool Factory
- Sugar Mill
- Agro Chemical Industry
- Ghee Industry
- Bahawalpur Chamber Of Commerce & Industry
- Textile Mill
- Cold Storage
- Purification Plant
- Oil Storage
- ⚡ Grid Station
- Sui Northern Gas Pipeline
- Builtup Area
- Union Council Boundary
- Tehsil Boundary
- District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Hazard Zone (g)*

- 2B (0.16-0.24) Medium

Zones are categories as per classification of Pakistan Engineering Council. Symbol "(g)" represent Gravitational Acceleration

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

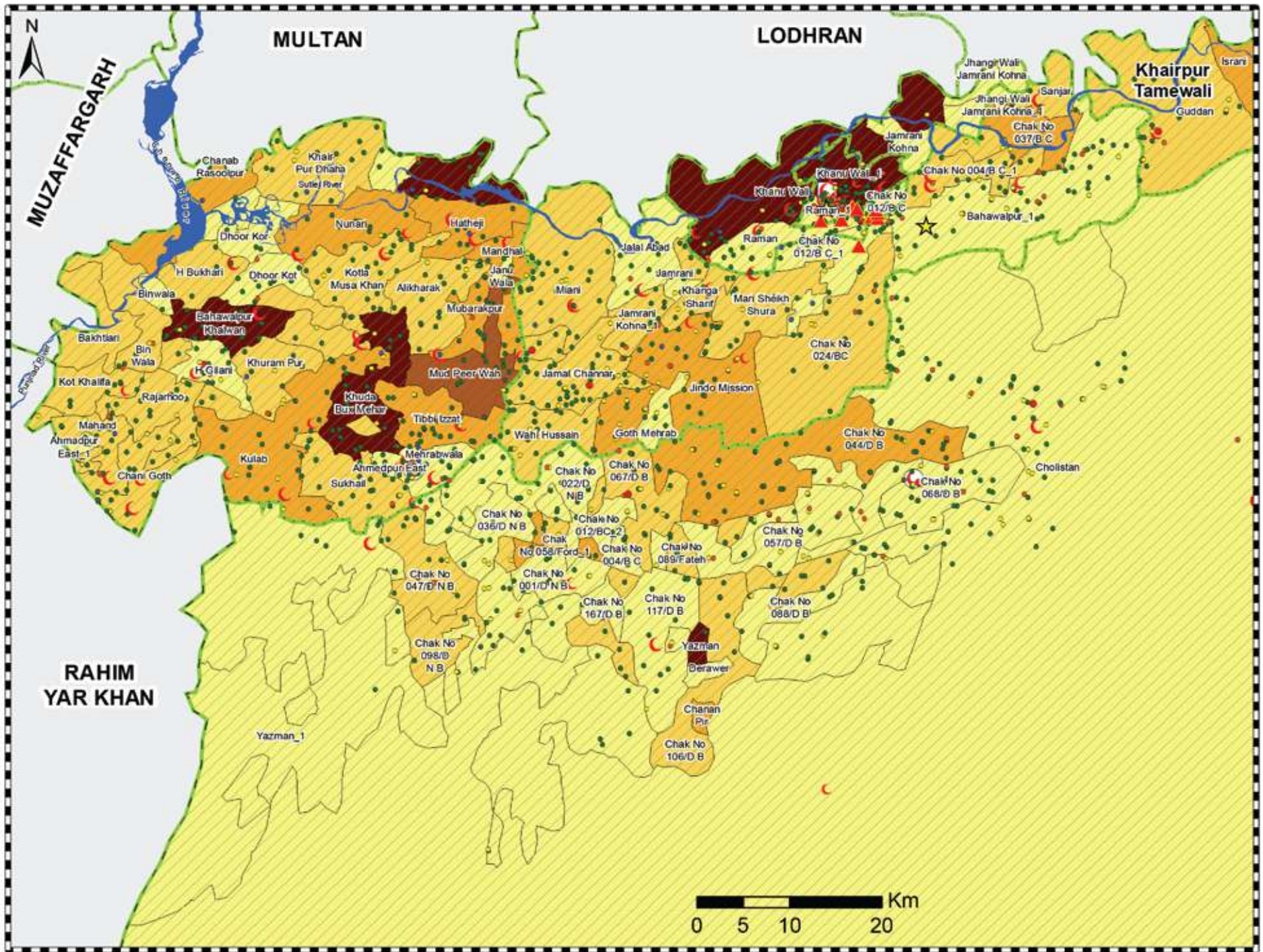
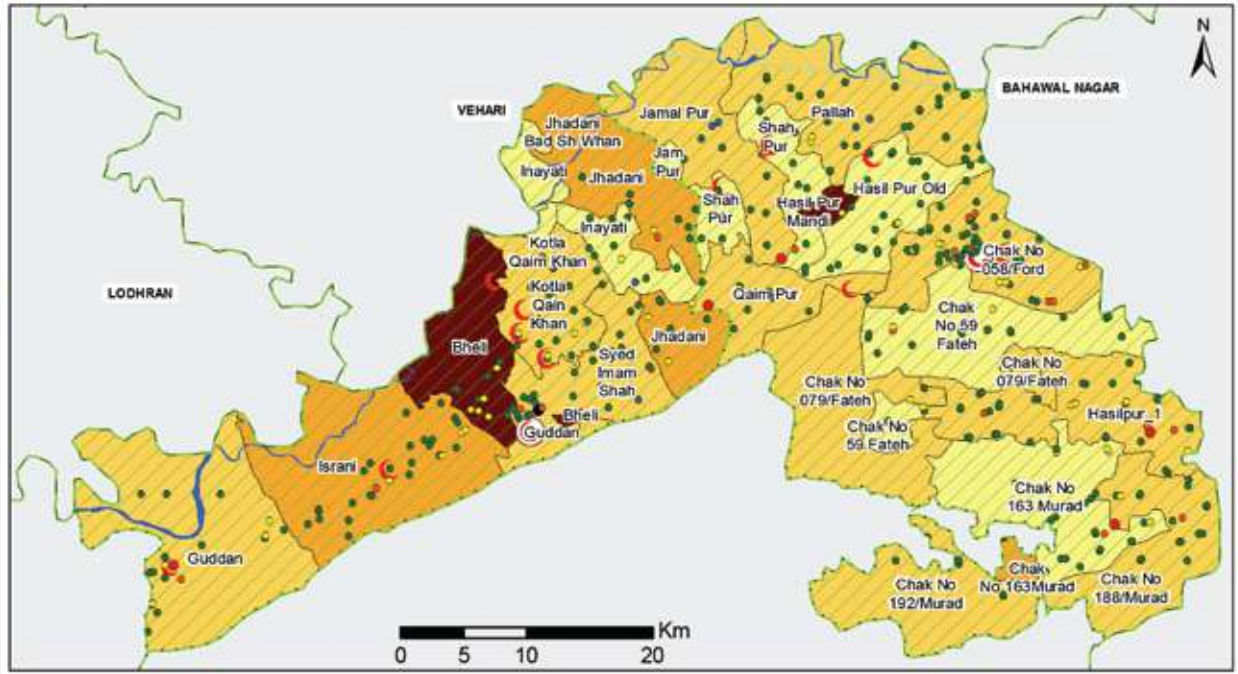
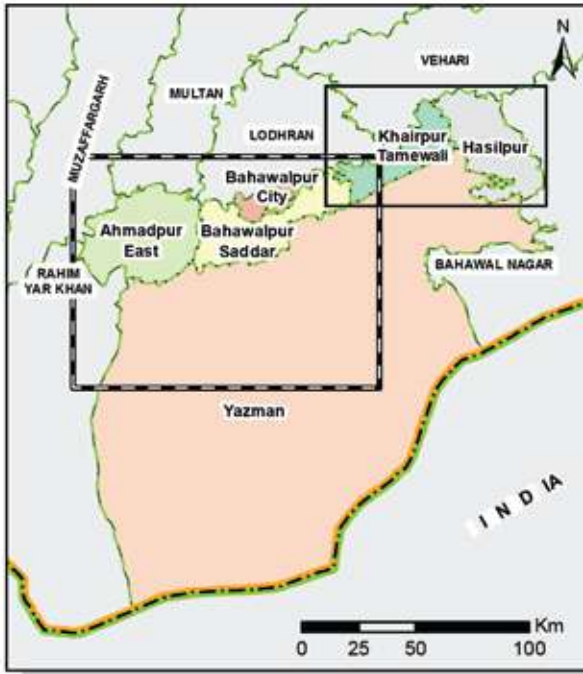
MAP INFORMATION

Data Source(s):
Punjab Agricultural Board, Government of Punjab
Directorate General of Petroleum Concessions

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-628-APR-2016-EXP-03-NDMA-475-C(BU-MI-CI)
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

SCHOOLS, HEALTH AND BUILDING EXPOSED TO EARTHQUAKE 50 YEAR RETURN PERIOD



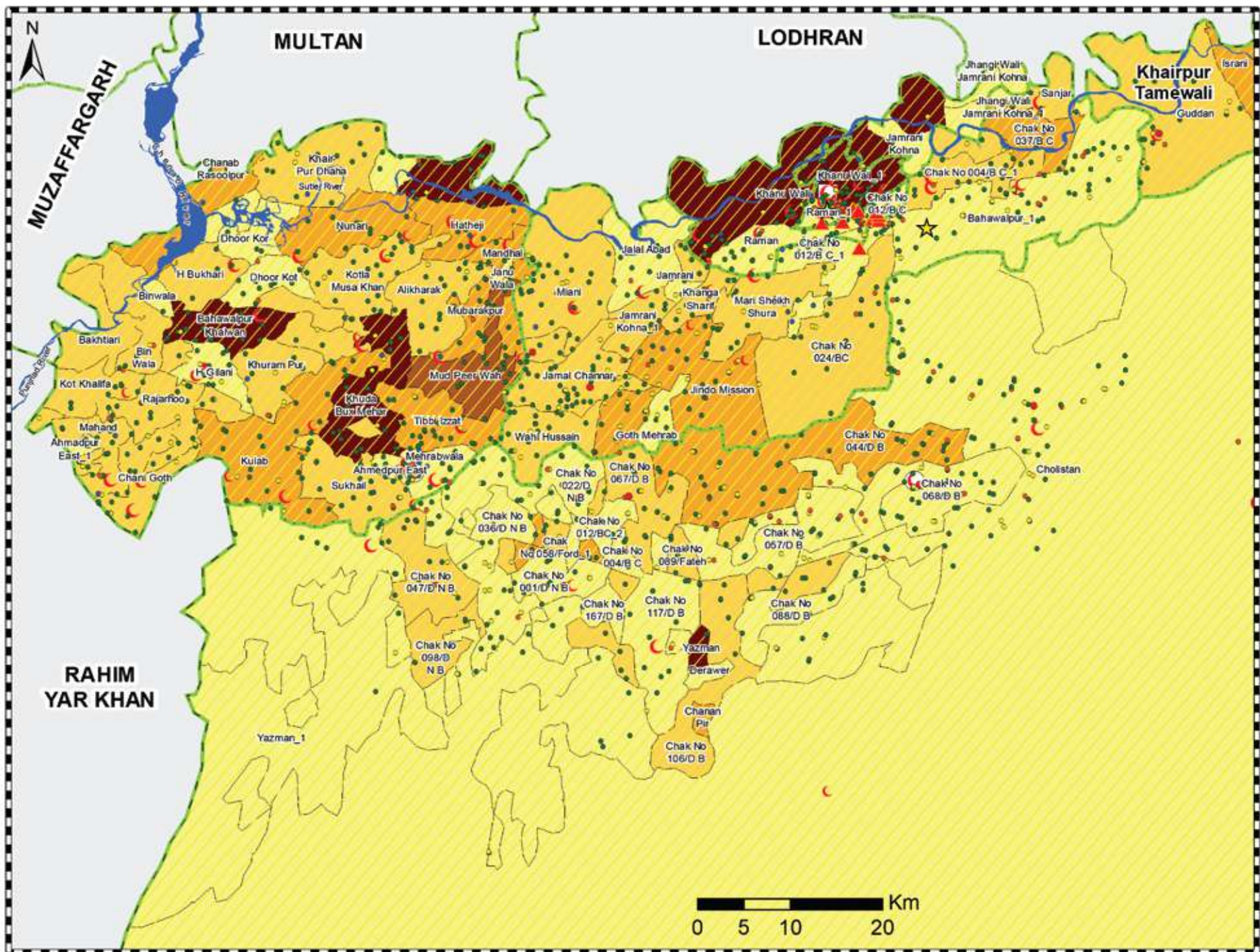
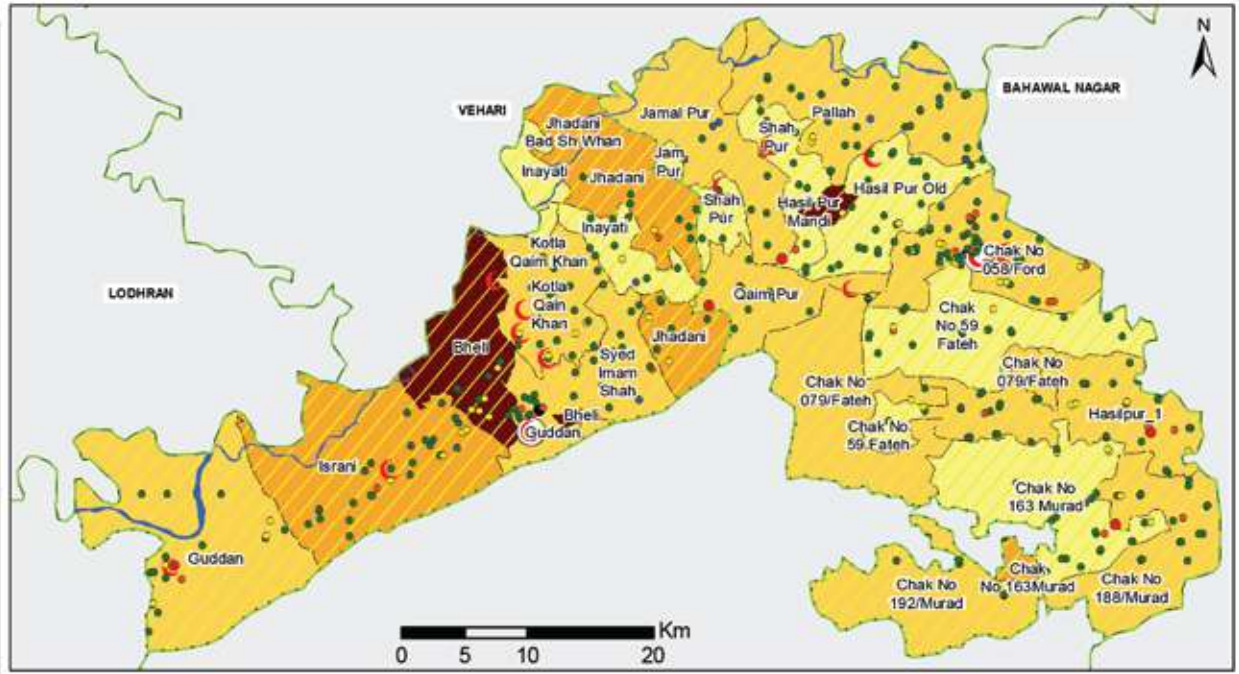
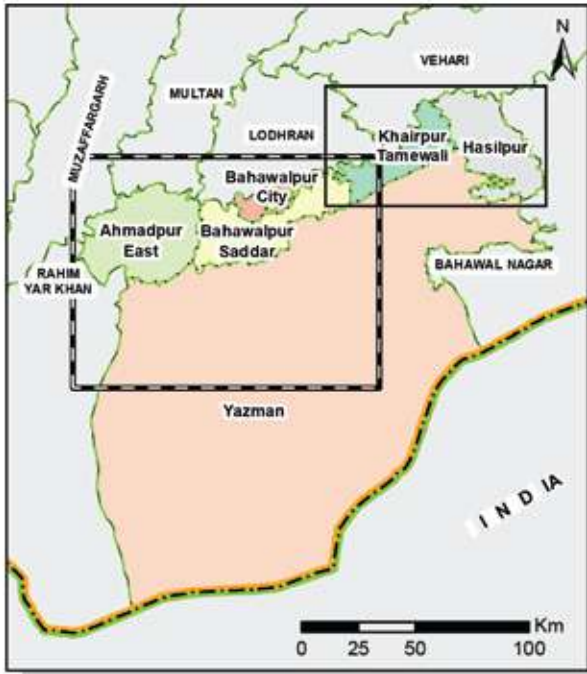
Legend

| | | |
|--------------------------------------|------------------------------|------------------------|
| District Headquarter Hospital | High School | Very Low (Zone 1) |
| Tehsil Headquarter Hospital | Middle School | Low (Zone 2A) |
| Civil Hospital & Tuberculosis Clinic | Primary School | High (Zone 2B) |
| Basic Health Unit | Masjid/Maktab School | Very High (Zone 2C) |
| Rural Health Centre | | River and Water Body |
| Maternal/Child Health Centre | Building Distribution | Tehsil Boundary |
| University | Abc < 4000 | District Boundary |
| College | Abc 4000 - 6000 | Provincial Boundary |
| Higher Secondary School | Abc 6000 - 8000 | Line of Control |
| | Abc 8000 - 10000 | International Boundary |
| | Abc > 10000 | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION
 Data Source(s):
 Pakistan Bureau of Statistics
 School Education Department
 World Health Organization
 Health Department Punjab
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-603-APR-2016-EXP-03-NDMA-50-C(HF-EF-BD)
 Prepared by: Project Management Unit, NDMA
 Last Updated: 20th April, 2017

SCHOOLS, HEALTH AND BUILDING EXPOSED TO EARTHQUAKE 475 YEAR RETURN PERIOD



Legend

- | | | |
|--------------------------------------|------------------------------|--|
| District Headquarter Hospital | High School | Return Period 475 Years Moderate (Zone 2B) |
| Tehsil Headquarter Hospital | Middle School | River and Water Body |
| Civil Hospital & Tuberculosis Clinic | Primary School | Tehsil Boundary |
| Basic Health Unit | Masjid/Maktab School | District Boundary |
| Rural Health Centre | | Provincial Boundary |
| Maternal/Child Health Centre | Building Distribution | Line of Control |
| University | Abc < 4000 | International Boundary |
| College | Abc 4000 - 6000 | |
| Higher Secondary School | Abc 6000 - 8000 | |
| | Abc 8000 - 10000 | |
| | Abc > 10000 | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

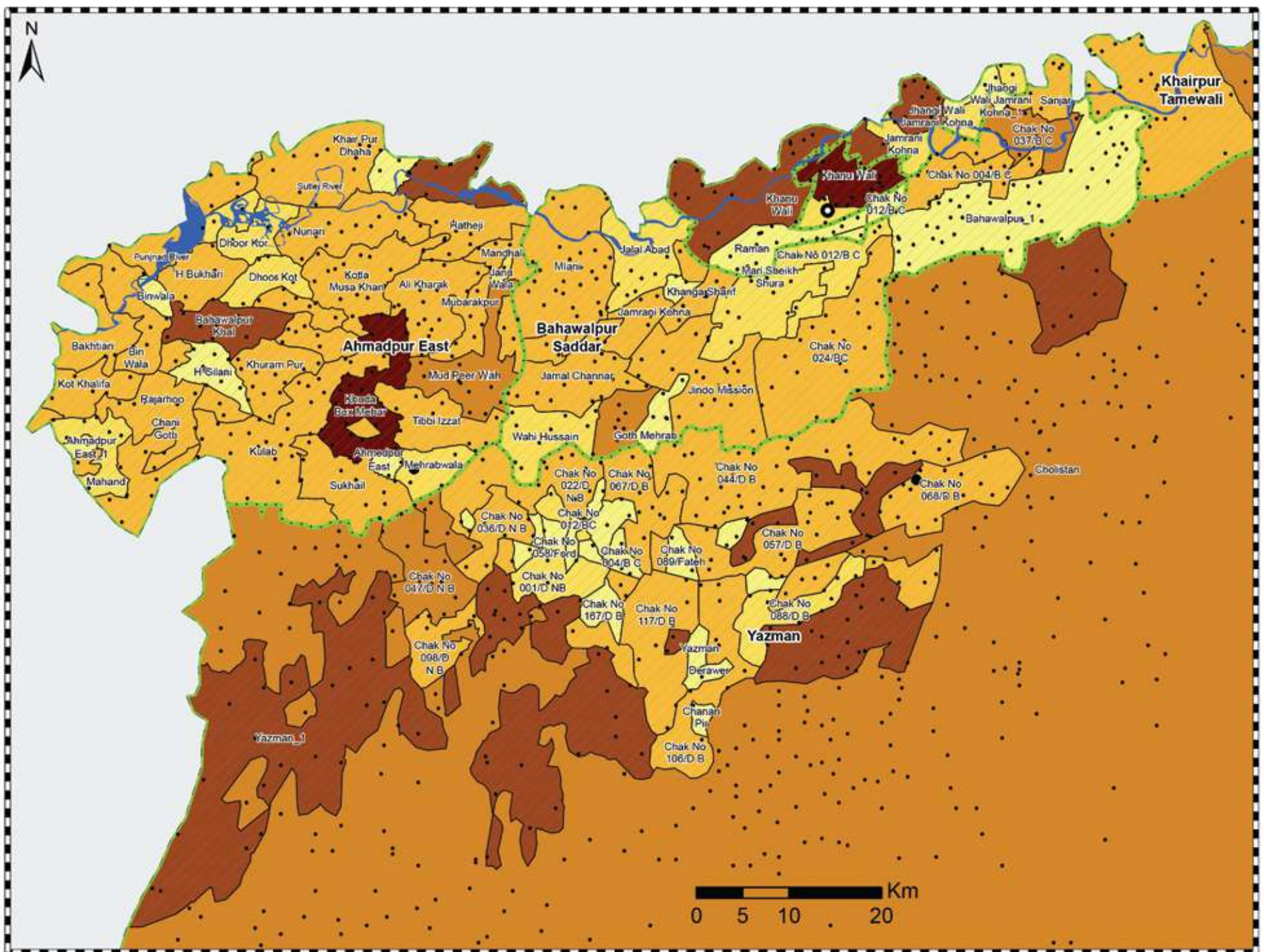
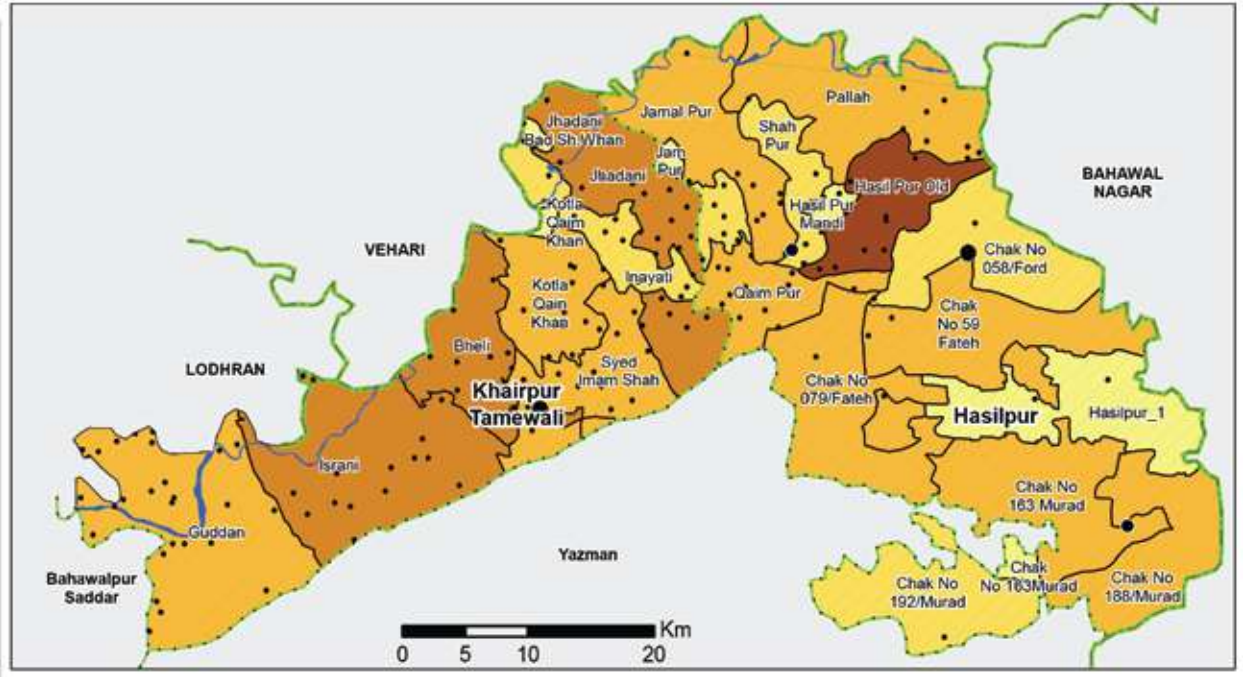
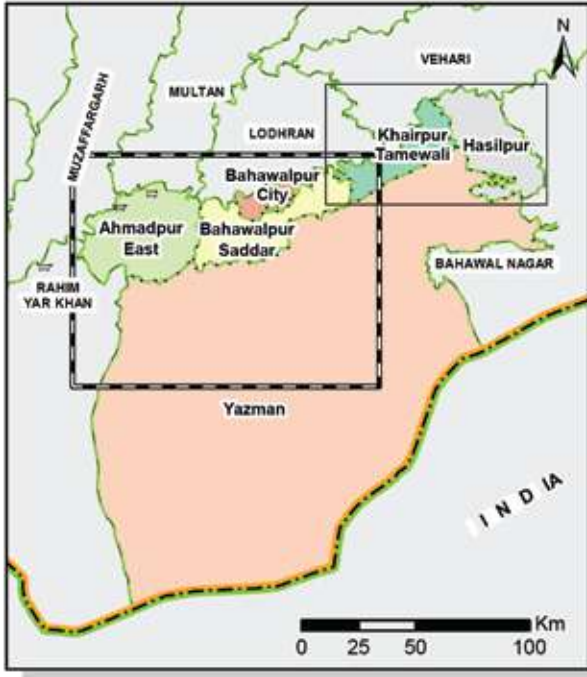


MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics
School Education Department
World Health Organization
Health Department Punjab

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-603-APR-2016-EXP-03-NDMA-475-C(HF-EF-BD)
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

SETTLEMENTS, VILLAGES, MAJOR TOWNS AND POPULATION EXPOSED TO EARTHQUAKE RETURN PERIOD 50 YEARS



Legend

- District Headquarter
- Tehsil Headquarter
- Major Towns
- Settlements / Villages

Population Distribution

| | |
|-----|----------------|
| Abc | <= 15000 |
| Abc | 15001 - 30000 |
| Abc | 30001 - 45000 |
| Abc | 45001 - 90000 |
| Abc | 90001 - 180000 |
| Abc | > 180000 |

Earthquake Hazard

- Very Low (Zone 1)
- River and Water Body
- Abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

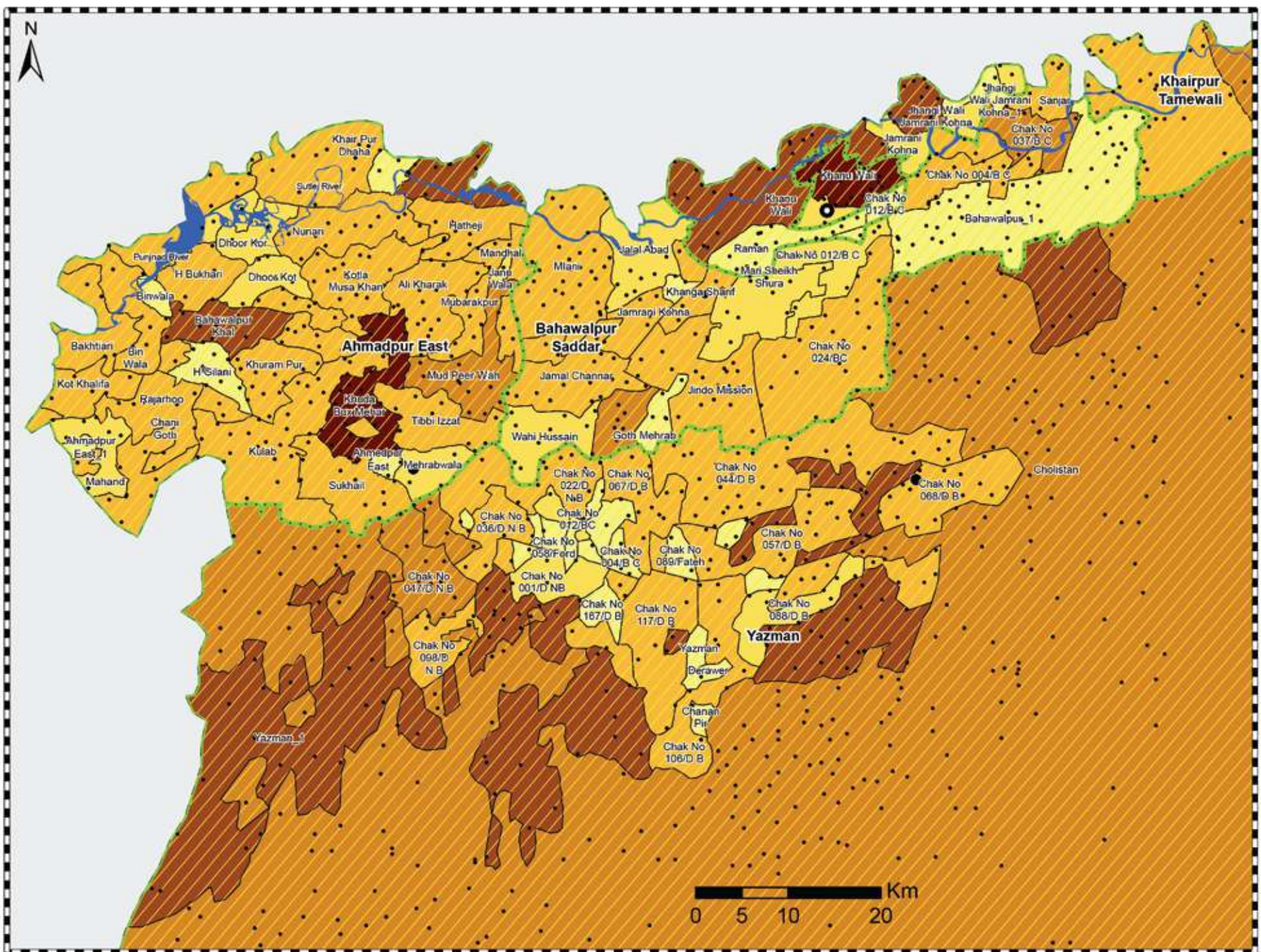
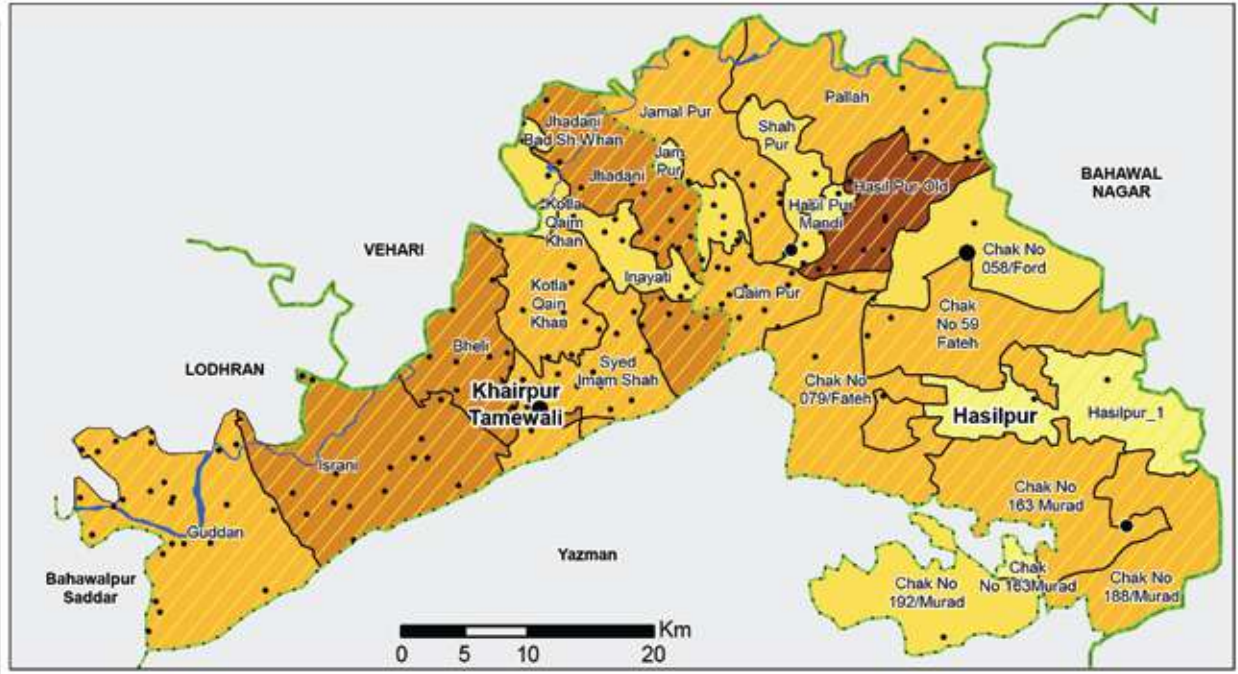
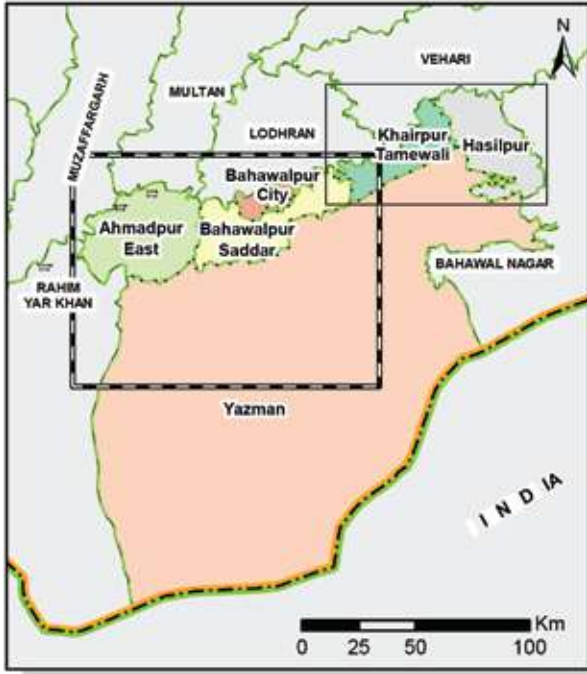
MAP INFORMATION

Data Source(s):
Pakistan Meteorological Department
Survey of Pakistan

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-02-NDMA-DP-C(POP-SET)
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

SETTLEMENTS, VILLAGES, MAJOR TOWNS AND POPULATION EXPOSED TO EARTHQUAKE RETURN PERIOD 475 YEARS



Legend

- District Headquarter
- Tehsil Headquarter
- Major Towns
- Settlements / Villages

Population Distribution

| | |
|-----|----------------|
| Abc | <= 15000 |
| Abc | 15001 - 30000 |
| Abc | 30001 - 45000 |
| Abc | 45001 - 90000 |
| Abc | 90001 - 180000 |
| Abc | > 180000 |

Earthquake Hazard

- Medium (Zone 2B)
- River and Water Body

Boundaries

- Abc Tehsil Boundary
- ABC District Boundary
- Provincial Boundary
- Line of Control
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
Pakistan Meteorological Department
Survey of Pakistan

Datum: WGS 1984
Units: Degree

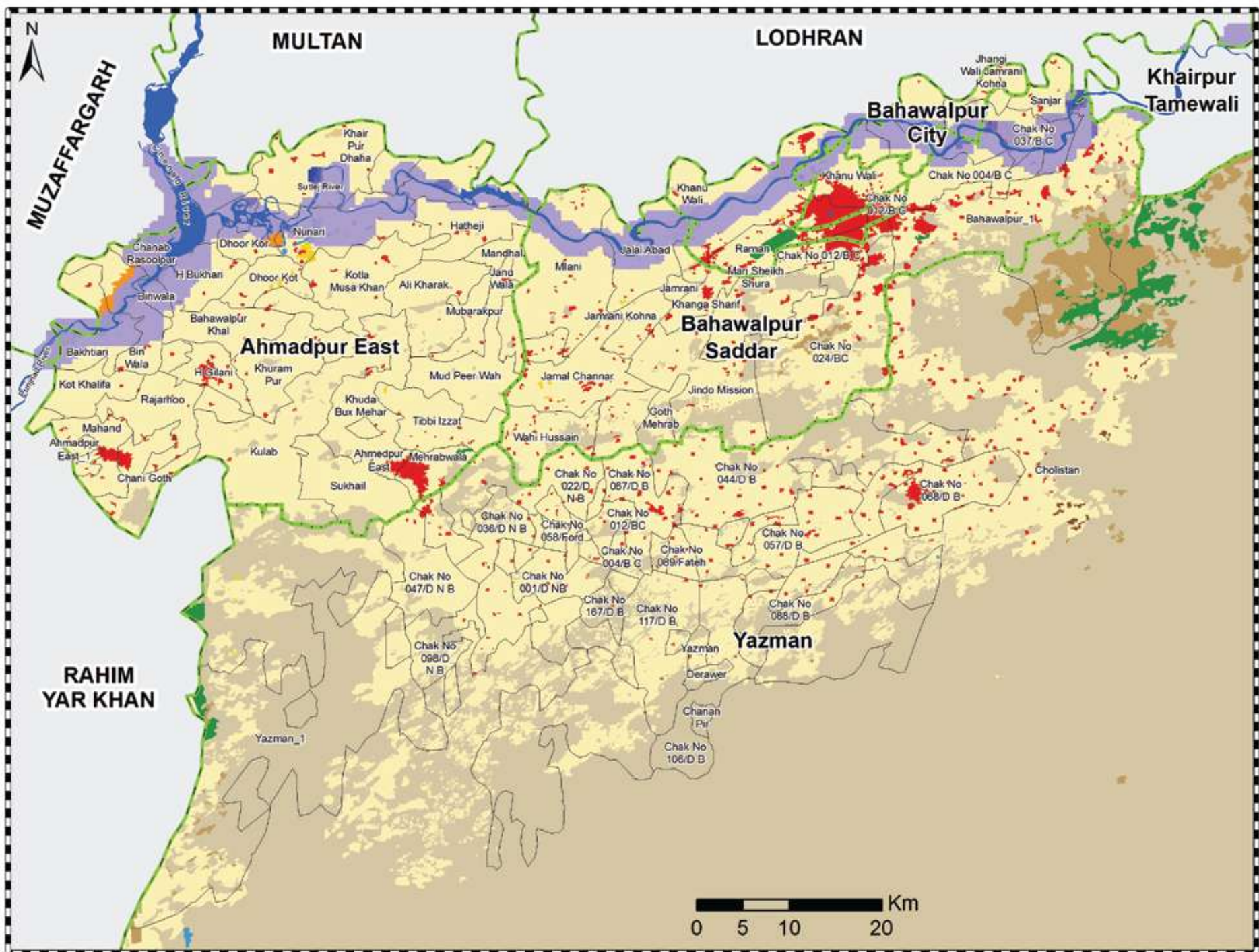
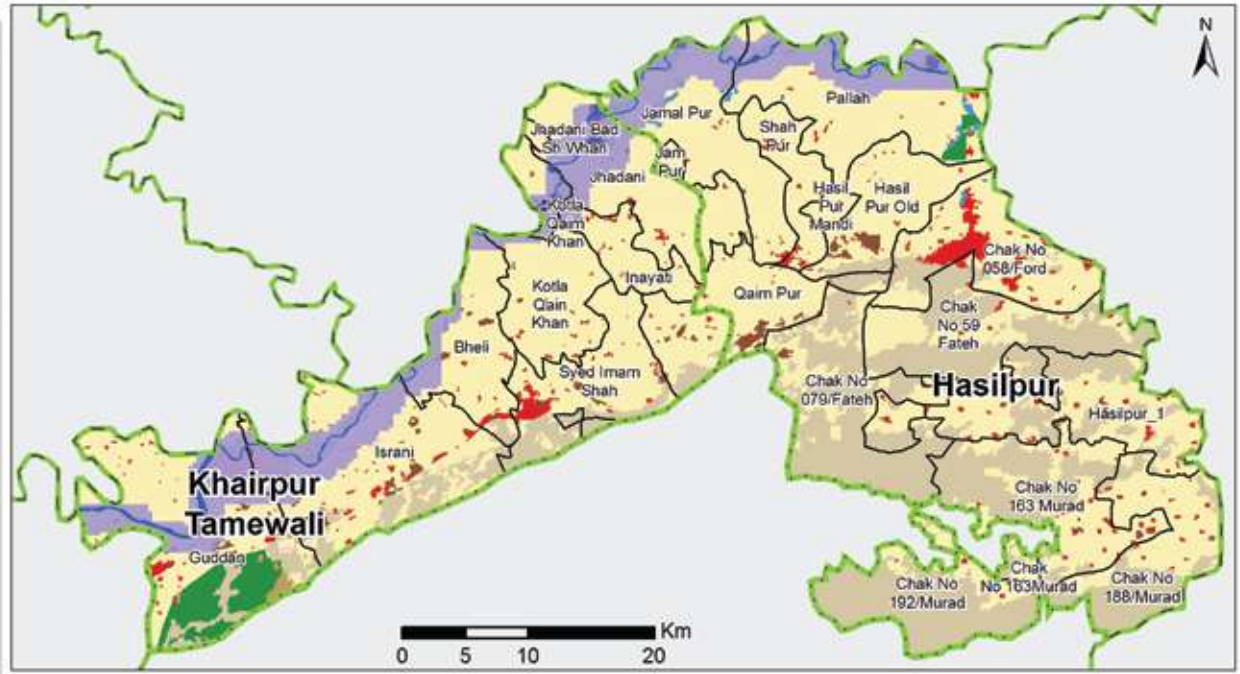
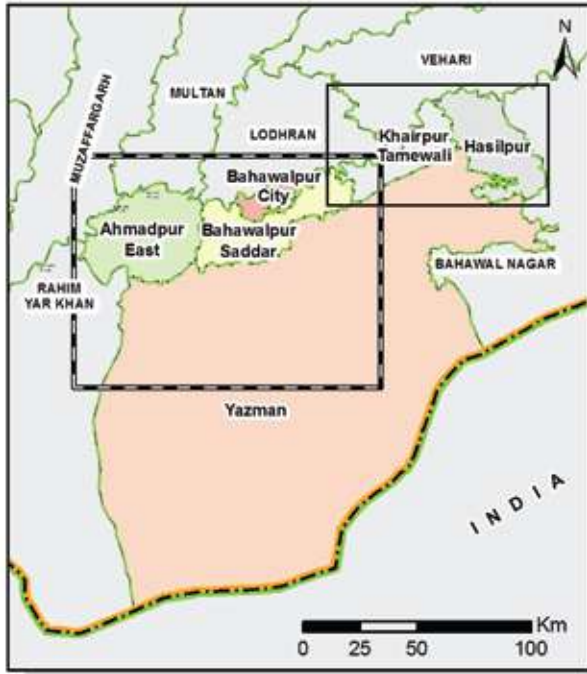
Map No: MHVRA-PUN-603-APR-2016-EXP-03-NDMA-475-C(POP-SET)
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

ELEMENTS EXPOSED TO FLOOD HAZARD

| UNION COUNCILS | DEMOGRAPHICS | | | HOUSING & SETTLEMENTS | | | | TELECOMMUNICATION TOWERS | | INDUSTRIAL UNITS | | TRANSPORTATION INFRASTRUCTURE (IN KM) | | | EDUCATION FACILITIES | | CRITICAL INFRASTRUCTURE | | LAND USE & LAND COVER TYPE (AREA IN HA) | | | | | | MAJOR CROPS (AREA IN HECTARES) | | | | | | | | | | |
|---------------------------|--------------|---------|---------|-----------------------|-----------------------|----------------|---------------------|--------------------------|--------|------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------|----------------------|--------|-------------------------|-------------------|---|--------|----------------|---------------------|--------------|------------------------|--------------------------------|----------|------|-----------|----|---|---|---|---|---|---|
| | POPULATION | MALE | FEMALE | SETTLEMENTS | BUILDINGS (ALL TYPES) | PACCA BUILDING | SEMI PACCA BUILDING | KACHA BUILDING | TOWERS | INDUSTRIAL UNITS | MOTORWAY / HIGHWAY / GRAND TRUNK ROAD | SECONDARY ROADS (METALLED) | UNMETALLED ROAD/CART TRACK/PACK TRACK | RAILWAY TRACK | SCHOOLS | BOYS | GIRLS | NUMBER OF TEACHER | SMGPA* (GAS PIPELINE) | OTHERS | CROP IRRIGATED | CROP IN FLOOD PLAIN | CROP RAINFED | CROP MARGINAL & SALINE | ORCHARDS | BUILT UP | RICE | SUGARCANE | | | | | | | |
| AHMEDPUR EAST_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | |
| AHMEDPUR EAST | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | |
| ALI KHARAK | 38,976 | 20,385 | 18,591 | 17 | 5,818 | 3,627 | 360 | 1,831 | 0 | 0 | 0 | 21 | 0 | 0 | 23 | 1,053 | 681 | 54 | 12 | 0 | 5,787 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | |
| BAHAWALPUR KHALWAN | 90,965 | 47,399 | 43,566 | 18 | 13,577 | 6,009 | 2,103 | 5,465 | 2 | 0 | 0 | 5 | 5 | 0 | 24 | 1,042 | 613 | 45 | 9 | 0 | 8,285 | 0 | 0 | 0 | 13 | 32 | 11 | 235 | 0 | | | | | | |
| BAKHTIARI | 35,574 | 18,498 | 17,076 | 4 | 5,310 | 2,418 | 101 | 2,791 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 4,414 | 273 | 0 | 0 | 0 | 20 | 3 | 298 | 0 | | | | | | |
| BIN WALA | 40,047 | 20,880 | 19,167 | 14 | 5,977 | 2,162 | 1,092 | 2,723 | 8 | 0 | 0 | 4 | 0 | 0 | 8 | 1,119 | 610 | 50 | 0 | 0 | 5,788 | 695 | 0 | 0 | 0 | 53 | 4 | 52 | 0 | | | | | | |
| BIN WALA | 6,991 | 3,760 | 3,231 | 1 | 1,043 | 671 | 23 | 350 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 170 | 75 | 0 | 0 | 0 | 659 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | | | | | |
| CHAMAB RASOOLPUR | 41,492 | 21,620 | 19,872 | 8 | 6,193 | 1,901 | 394 | 3,898 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2,674 | 993 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 | | | | | |
| CHANI GOH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |
| DHOOR KOR | 17,050 | 8,908 | 8,142 | 3 | 2,545 | 1,197 | 149 | 1,198 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 425 | 313 | 12 | 0 | 0 | 2,133 | 579 | 0 | 0 | 0 | 13 | 0 | 11 | 0 | 0 | | | | | |
| DHOOR KOT | 23,119 | 12,224 | 10,895 | 8 | 3,451 | 1,703 | 165 | 1,583 | 4 | 0 | 0 | 6 | 0 | 0 | 12 | 746 | 281 | 43 | 1 | 0 | 3,633 | 466 | 0 | 91 | 0 | 45 | 19 | 85 | 0 | 0 | | | | | |
| H BUKHARI | 32,763 | 17,291 | 15,472 | 4 | 4,890 | 2,181 | 477 | 2,232 | 8 | 0 | 0 | 3 | 4 | 0 | 5 | 299 | 108 | 12 | 0 | 0 | 3,591 | 88 | 0 | 0 | 33 | 36 | 29 | 172 | 0 | 0 | | | | | |
| H GILANI | 14,113 | 7,345 | 6,767 | 11 | 2,106 | 840 | 290 | 977 | 30 | 0 | 0 | 27 | 3 | 8 | 18 | 1,580 | 1,384 | 120 | 11 | 0 | 3,698 | 0 | 0 | 0 | 0 | 339 | 8 | 458 | 0 | 0 | | | | | |
| HATHEJI | 42,631 | 22,173 | 20,458 | 8 | 6,363 | 2,593 | 612 | 3,158 | 4 | 0 | 0 | 3 | 0 | 0 | 10 | 640 | 260 | 28 | 3 | 0 | 4,540 | 0 | 0 | 0 | 0 | 63 | 0 | 367 | 0 | 0 | | | | | |
| JANU WALA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| KHAI PUR DHAHA | 34,382 | 18,046 | 16,336 | 12 | 5,132 | 1,636 | 494 | 3,002 | 5 | 0 | 0 | 1 | 0 | 0 | 16 | 111 | 66 | 5 | 14 | 0 | 7,846 | 0 | 0 | 28 | 0 | 167 | 0 | 67 | 0 | 0 | 0 | | | | |
| KHUDA BUX MEHAR | 215,201 | 113,189 | 102,012 | 19 | 32,119 | 22,364 | 1,765 | 7,990 | 12 | 0 | 0 | 5 | 5 | 0 | 21 | 2,056 | 767 | 101 | 18 | 0 | 6,611 | 0 | 0 | 0 | 38 | 74 | 1 | 85 | 0 | 0 | | | | | |
| KHURAM PUR | 30,869 | 16,119 | 14,750 | 22 | 4,607 | 2,279 | 222 | 2,106 | 5 | 0 | 0 | 12 | 4 | 0 | 19 | 1,518 | 1,032 | 86 | 14 | 0 | 6,829 | 0 | 0 | 1 | 0 | 75 | 0 | 390 | 0 | 0 | | | | | |
| KOT KHALIFA | 38,377 | 19,854 | 18,523 | 6 | 5,728 | 3,036 | 293 | 2,399 | 1 | 0 | 0 | 9 | 0 | 0 | 11 | 564 | 847 | 43 | 0 | 0 | 4,194 | 0 | 0 | 0 | 0 | 36 | 36 | 86 | 0 | 0 | | | | | |
| KOTLA MUSA KHAN | 39,638 | 20,902 | 18,736 | 17 | 5,916 | 3,298 | 661 | 1,957 | 15 | 0 | 0 | 6 | 0 | 0 | 27 | 1,109 | 896 | 65 | 18 | 0 | 6,416 | 0 | 0 | 37 | 4 | 108 | 2 | 270 | 0 | 0 | | | | | |
| KULAB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| MAHAND | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| MANDHAL | 44,257 | 23,168 | 21,089 | 3 | 6,605 | 2,819 | 940 | 2,846 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 835 | 162 | 37 | 0 | 0 | 1,811 | 0 | 0 | 0 | 0 | 4 | 0 | 202 | 0 | 0 | | | | | |
| MEHRABWALA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| MUBARAKPUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| MUD PEER WAH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| MUMARI | 40,636 | 21,082 | 19,554 | 14 | 6,065 | 3,096 | 357 | 2,613 | 5 | 0 | 0 | 8 | 0 | 0 | 14 | 905 | 569 | 52 | 19 | 0 | 5,724 | 170 | 0 | 177 | 0 | 148 | 0 | 73 | 0 | 0 | 0 | 0 | | | |
| RAJARHOO | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| SUKHAIL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| TIBBIZAT | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| TEHSIL TOTAL: | 827,081 | 432,843 | 394,237 | 189 | 123,445 | 63,830 | 10,498 | 49,119 | 99 | 0 | 0 | 88 | 27 | 12 | 222 | 14,172 | 8,664 | 753 | 118 | 0 | 84,633 | 3,267 | 0 | 335 | 87 | 1,289 | 115 | 2,967 | 0 | 0 | 0 | 0 | | | |
| BAHAWALPUR_1 | 1,735 | 910 | 826 | 47 | 244 | 38 | 66 | 140 | 54 | 2 | 0 | 54 | 25 | 2 | 58 | 4,690 | 4,318 | 337 | 0 | 1 | 11,990 | 0 | 0 | 0 | 4 | 1,448 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | | |
| CHAK NO 004/B C_1 | 35,067 | 18,457 | 16,610 | 16 | 4,939 | 1,356 | 938 | 2,645 | 11 | 0 | 0 | 9 | 1 | 2 | 20 | 1,653 | 1,314 | 96 | 0 | 0 | 4,176 | 0 | 0 | 0 | 0 | 188 | 0 | 19 | 0 | 0 | 0 | 0 | 0 | | |
| CHAK NO 012/B C_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| CHAK NO 024/BC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| CHAK NO 037/B C | 48,520 | 25,169 | 23,351 | 12 | 6,834 | 1,222 | 1,664 | 3,948 | 1 | 0 | 0 | 16 | 0 | 0 | 24 | 1,414 | 1,289 | 109 | 0 | 0 | 4,994 | 602 | 0 | 0 | 0 | 135 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| GOTH MEHRAB | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| JALAL ABAD | 27,660 | 14,563 | 13,097 | 9 | 3,896 | 1,729 | 545 | 1,622 | 0 | 0 | 0 | 6 | 7 | 1 | 11 | 1,007 | 354 | 36 | 0 | 0 | 5,199 | 134 | 0 | 19 | 0 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| JAMAL CHANNAR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| JAMRANI | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JAMRANI KOHNA_1 | 31,326 | 16,421 | 14,905 | 9 | 4,413 | 1,898 | 1,077 | 1,438 | 24 | 1 | 4 | 12 | 19 | 6 | 0 | 1,247 | 1,670 | 88 | 7 | 0 | 3,357 | 0 | 0 | 7 | 22 | 1,038 | 56 | 739 | 0 | 0 | 0 | 0 | 0 | | |
| JHANGI WALI JAMRANI KOHNA | 567 | 302 | 265 | 2 | 75 | 0 | 0 | 75 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 403 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| JINDO MISSION | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KHANGA SHARIF | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| KHANU WALI_1 | 604,222 | 328,787 | 275,435 | 14 | 85,102 | 50,242 | 16,223 | 21,765 | 100</ | | | | | | | | | | | | | | | | | | | | | | | | | | |

| UNION COUNCILS | DEMOGRAPHICS | | HOUSING & SETTLEMENTS | | | TELECOMMUNICATION TOWERS | | INDUSTRIAL UNITS | | TRANSPORTATION INFRASTRUCTURE (IN KM) | | | | HEALTH FACILITIES | | EDUCATION FACILITIES | | CRITICAL INFRASTRUCTURE | | LAND USE & LAND COVER TYPE (AREA IN HA) | | | | | MAJOR CROPS (AREA IN HECTARES) | | |
|----------------------|--------------|-----------|-----------------------|-------------|-----------------------|--------------------------|---------------------|------------------|-------------------------------------|---------------------------------------|---------------------------------------|---------------|---------|-------------------|--------------------|----------------------|------------------------|-------------------------|----------------|---|--------------|------------------------|----------|----------|--------------------------------|-----------|---|
| | POPULATION | MALE | FEMALE | SETTLEMENTS | BUILDINGS (ALL TYPES) | PACCA BUILDING | SEMI PACCA BUILDING | KACHA BUILDING | MOTORWAY /HIGHWAY/ GRAND TRUNK ROAD | SECONDARY ROADS (METALLED) | UNMETALLED ROAD/CART TRACK/PACK TRACK | RAILWAY TRACK | SCHOOLS | BOYS | NUMBER OF STUDENTS | NUMBER OF TEACHER | SINGPL* (GAS PIPELINE) | OTHERS | CROP IRRIGATED | CROP IN FLOOD PLAIN | CROP RAINFED | CROP MARGINAL & SALINE | ORCHARDS | BUILT UP | RICE | SUGARCANE | |
| HASILPUR_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 058/FORD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 079/FATEH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 163 MURAD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 163 MURAD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 188/MURAD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 192/MURAD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 59 FATEH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HASIL PUR MANDI | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HASIL PUR OLD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JAM PUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| JAMAL PUR | 35,262 | 18,360 | 16,902 | 11 | 5,748 | 1,646 | 417 | 3,685 | 0 | 25 | 30 | 0 | 12 | 409 | 1,194 | 48 | 0 | 8,436 | 27 | 0 | 0 | 0 | 0 | 89 | 190 | 36 | 0 |
| PALLAH | 38,513 | 20,137 | 18,376 | 9 | 5,748 | 1,646 | 417 | 3,685 | 0 | 42 | 32 | 4 | 38 | 2,227 | 1,441 | 132 | 6 | 10,557 | 79 | 0 | 0 | 0 | 0 | 148 | 859 | 48 | 0 |
| QAIM PUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SHAH PUR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TEHSIL TOTAL: | 73,775 | 38,497 | 35,278 | 20 | 11,496 | 3,292 | 834 | 7,370 | 0 | 67 | 62 | 4 | 50 | 2,636 | 2,635 | 180 | 6 | 18,993 | 106 | 0 | 0 | 0 | 0 | 236 | 1,049 | 83 | 0 |
| BHELI | 77,664 | 40,455 | 37,210 | 11 | 0 | 0 | 0 | 0 | 0 | 22 | 1 | 2 | 12 | 694 | 807 | 59 | 0 | 6,338 | 20 | 0 | 0 | 0 | 2 | 171 | 14 | 0 | 0 |
| GUDDAN | 31,401 | 16,397 | 15,004 | 27 | 4,831 | 1,576 | 138 | 3,117 | 0 | 29 | 38 | 11 | 19 | 2,602 | 1,928 | 127 | 0 | 10,093 | 586 | 0 | 0 | 0 | 67 | 385 | 1 | 10 | 0 |
| INAYATI | 24,620 | 12,902 | 11,718 | 11 | 3,788 | 1,493 | 348 | 1,947 | 0 | 21 | 3 | 0 | 11 | 717 | 273 | 27 | 0 | 4,277 | 40 | 0 | 0 | 0 | 23 | 121 | 31 | 1 | 0 |
| ISRANI | 46,240 | 24,136 | 22,104 | 15 | 7,114 | 1,648 | 715 | 4,468 | 0 | 29 | 25 | 16 | 30 | 1,996 | 1,550 | 125 | 0 | 11,056 | 586 | 0 | 0 | 0 | 79 | 392 | 6 | 19 | 0 |
| JHADANI | 47,583 | 24,549 | 23,034 | 22 | 7,320 | 2,523 | 330 | 4,468 | 0 | 31 | 25 | 5 | 17 | 1,293 | 830 | 68 | 0 | 10,237 | 188 | 0 | 0 | 0 | 0 | 132 | 123 | 25 | 0 |
| JHADANI BAD SH.WHAN) | 545 | 278 | 268 | 1 | 83 | 6 | 3 | 74 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 309 | 0 | 0 | 0 | 0 | 3 | 1 | 9 | 1 | 0 |
| KOTLA QAIM KHAN | 3,842 | 2,026 | 1,816 | 0 | 591 | 167 | 76 | 348 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 259 | 15 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| KOTLA QAIM KHAN | 32,749 | 16,852 | 15,896 | 12 | 5,038 | 2,123 | 168 | 2,747 | 0 | 38 | 1 | 0 | 26 | 1,480 | 821 | 87 | 0 | 6,364 | 0 | 0 | 0 | 0 | 0 | 85 | 85 | 1 | 0 |
| SYED IMAM SHAH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TEHSIL TOTAL: | 264,644 | 137,595 | 127,050 | 99 | 28,765 | 9,536 | 1,778 | 17,169 | 1 | 172 | 94 | 34 | 115 | 8,782 | 6,209 | 493 | 0 | 48,934 | 1,436 | 0 | 0 | 0 | 173 | 1,288 | 270 | 56 | 0 |
| YAZMAN_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 001/D N B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 004/B C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 012/BC_2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 017/D N B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 022/D N B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 024/BC_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 036/D N B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 037/B C_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 044/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 047/D N B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 057/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 058/FORD_1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 067/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 068/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 088/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 089/FATEH | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 098/D N B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 106/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 117/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAK NO 167/D B | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHAMAN PIR | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CHOLUSTAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DERAWER | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| YAZMAN | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TEHSIL TOTAL: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DISTRICT TOTAL: | 2,126,562 | 1,124,247 | 1,002,316 | 522 | 299,063 | 145,972 | 38,894 | 117,046 | 27 | 49 | 706 | 378 | 666 | 55,451 | 42,256 | 3,339 | 143 | 216,868 | 6,366 | 0 | 0 | 387 | 295 | 8,452 | 1,570 | 7,110 | 0 |

LAND USE & LAND COVER EXPOSED TO FLOOD RETURN PERIOD 10 YEAR



Legend

| | | |
|---|------------------------|---------------------------------|
| Bare Areas | River and Water Body | Return Period 10 Years No Flood |
| Bare Areas with Sparse Natural Vegetation | Union Council Boundary | Low |
| Built-up | Tehsil Boundary | Medium |
| Crop in Flood Plain | District Boundary | High |
| Crop Marginal and Irrigated Saline | Provincial Boundary | Very High |
| Crop Rainfed | Line of Control | |
| Crop Irrigated | International Boundary | |
| Forest - Natural Trees and Mangroves | | |
| Natural Vegetation in Wet Areas | | |
| Orchards | | |
| Range Lands - Natural Shrubs and Herbs | | |
| Snow and Glaciers | | |
| Wet Areas | | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

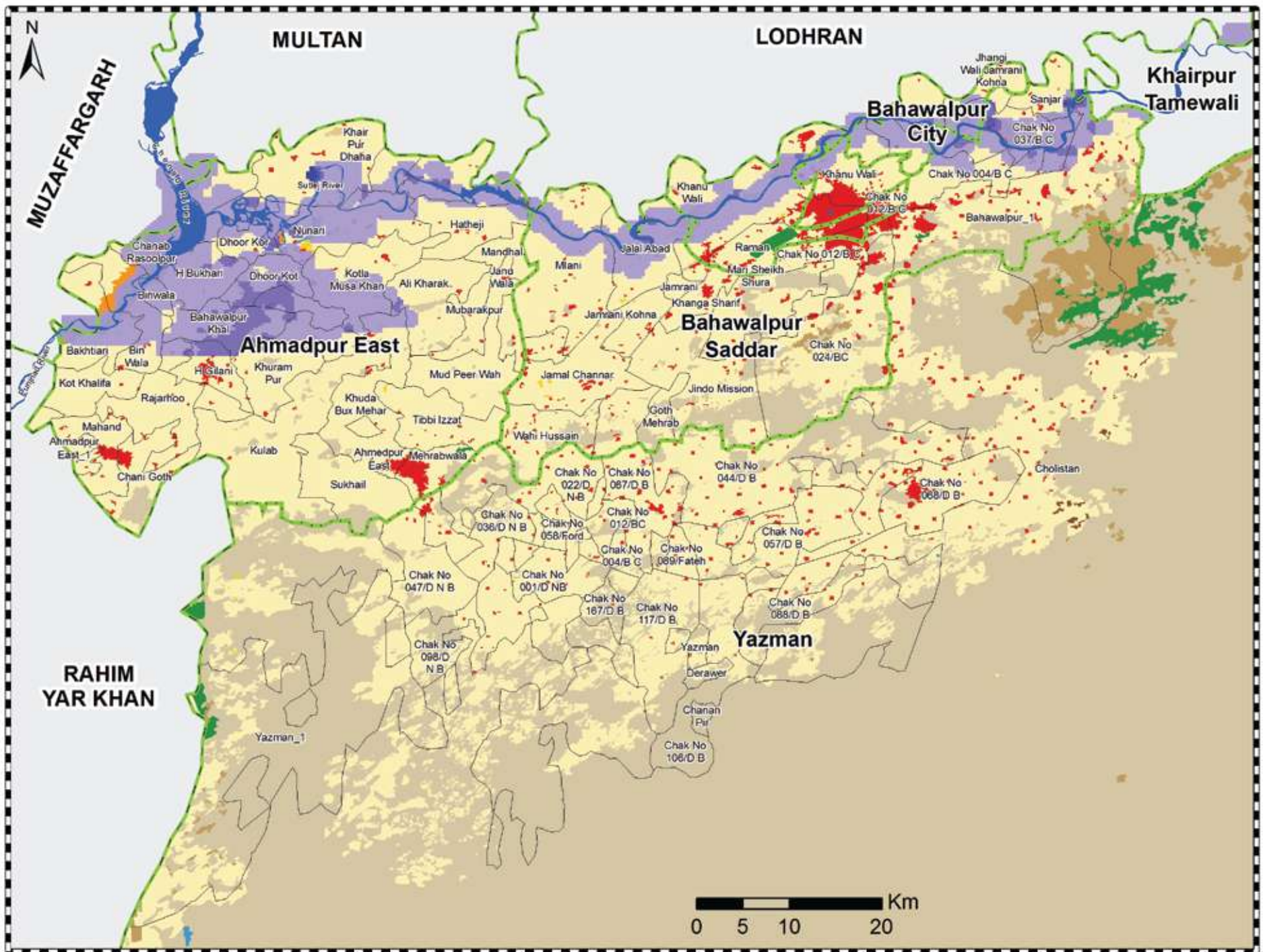
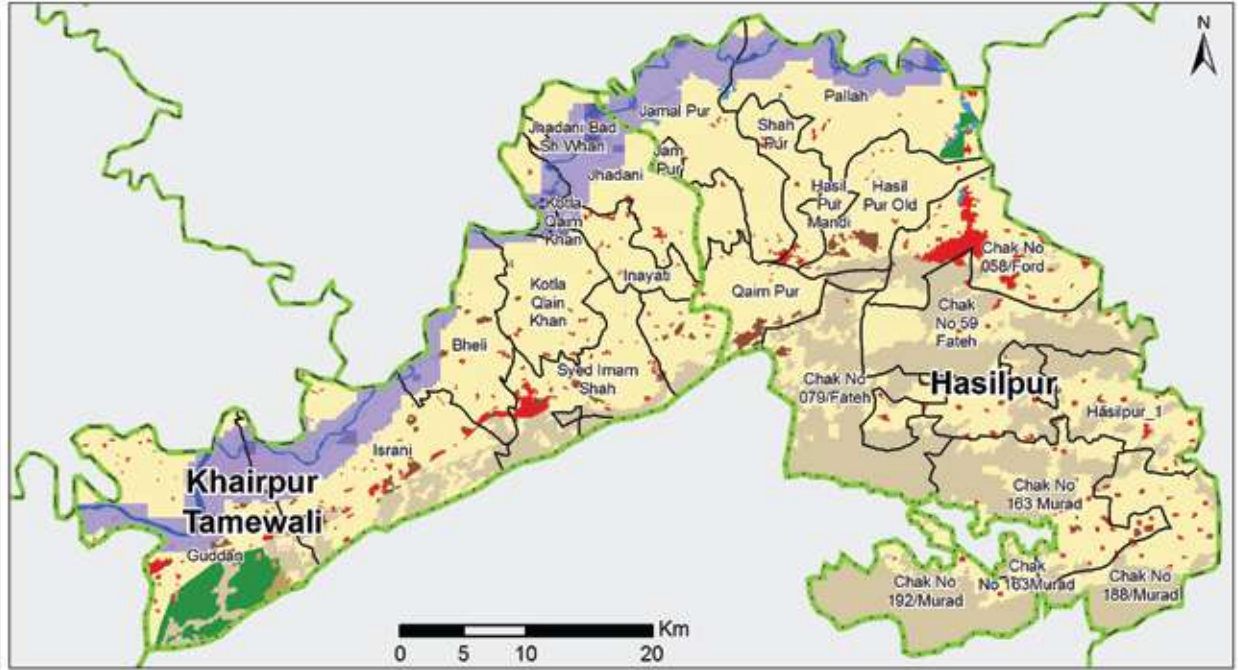
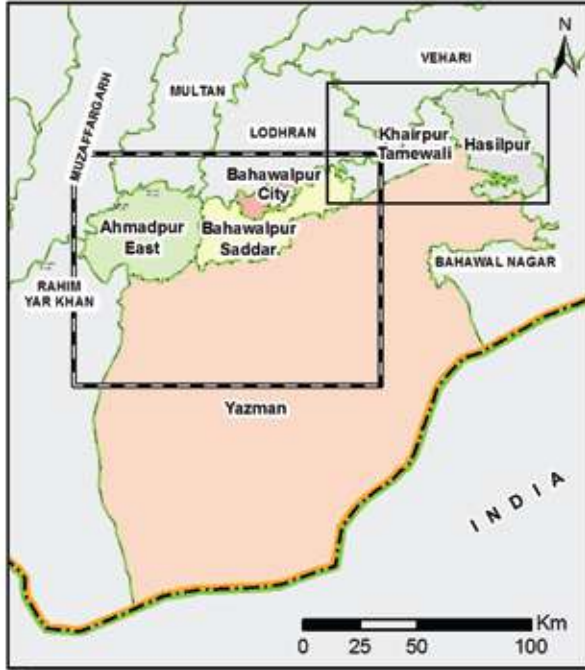
MAP INFORMATION

Data Source(s):
PBS, Govt. of Punjab, Govt. of Pakistan
Hazard Layer-NDMA, Landcover-SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-10-LULC
Prepared by: Project Management Unit, NDMA
Last Updated: 21st June, 2017

LAND USE & LAND COVER EXPOSED TO FLOOD RETURN PERIOD 50 YEAR



Legend

| | | |
|---|------------------------|----------------------------------|
| Bare Areas | River and Water Body | Return Period 50 Years: No Flood |
| Bare Areas with Sparse Natural Vegetation | Union Council Boundary | Low |
| Built-up | Tehsil Boundary | Medium |
| Crop in Flood Plain | District Boundary | High |
| Crop Marginal and Irrigated Saline | Provincial Boundary | Very High |
| Crop Rainfed | Line of Control | |
| Crop Irrigated | International Boundary | |
| Forest - Natural Trees and Mangroves | | |
| Natural Vegetation in Wet Areas | | |
| Orchards | | |
| Range Lands - Natural Shrubs and Herbs | | |
| Snow and Glaciers | | |
| Wet Areas | | |

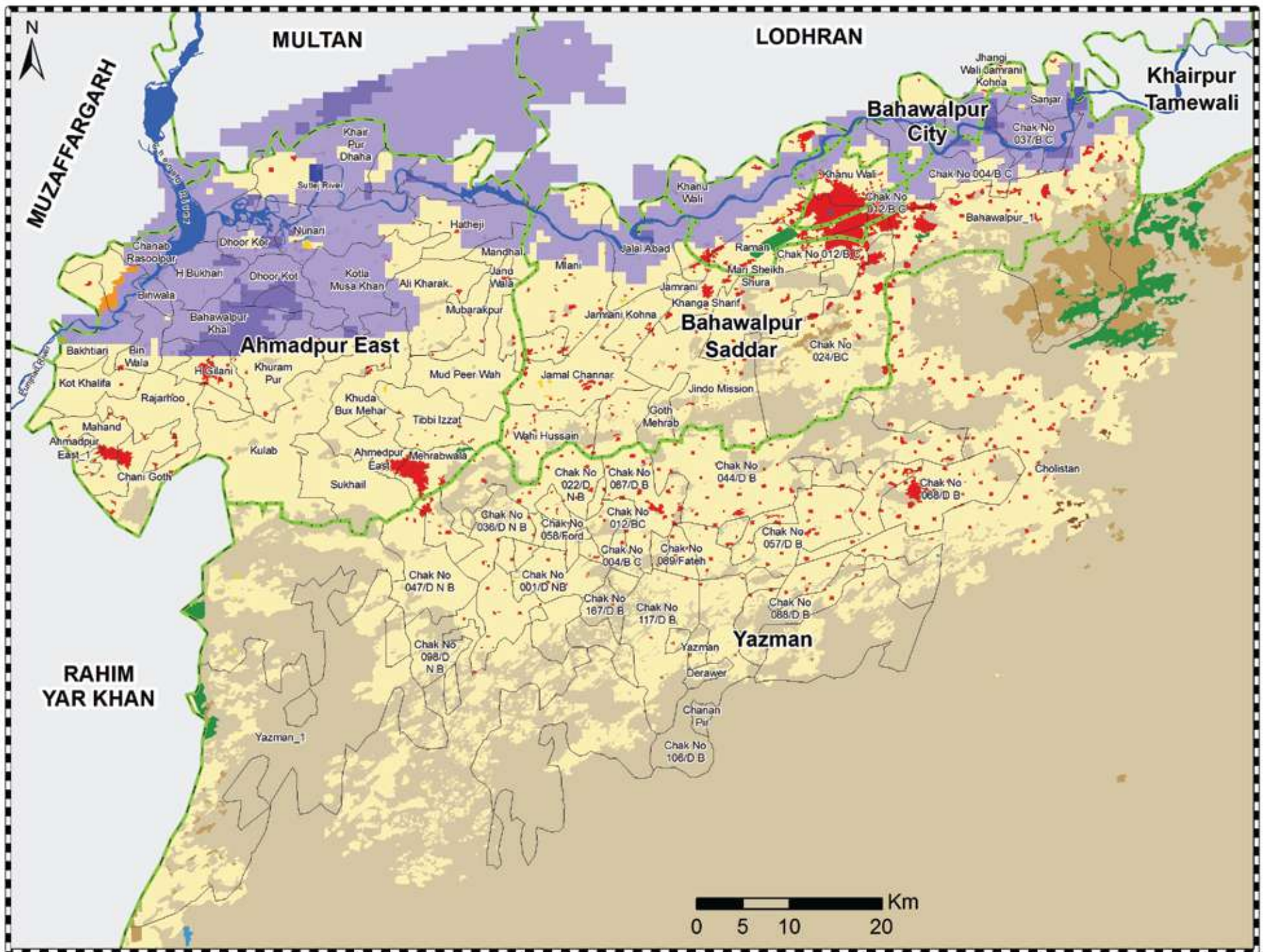
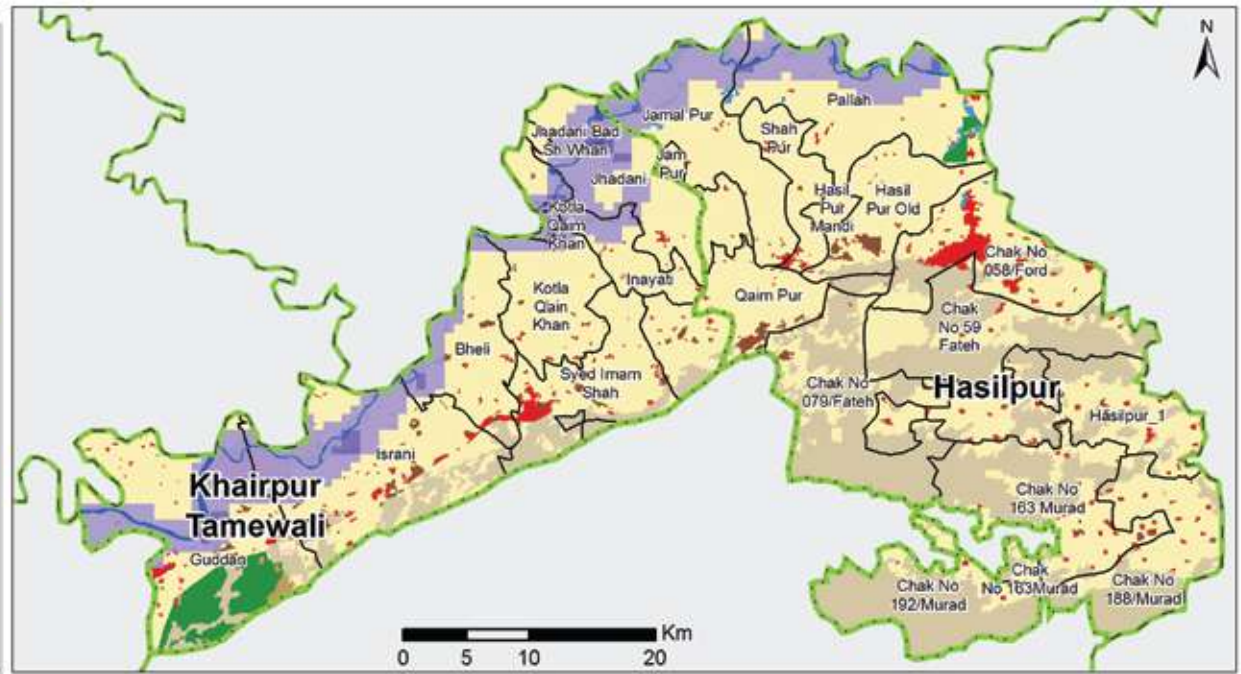
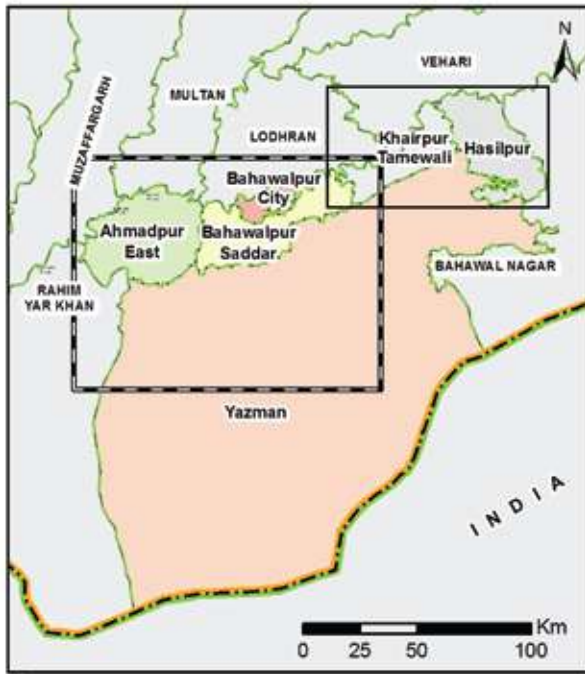
Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

Data Source(s): PBS, Govt. of Punjab, Govt. of Pakistan
Hazard Layer-NDMA, Landcover-SUPARCO

Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-50-LULC
Prepared by: Project Management Unit, NDMA
Last Updated: 22th June, 2017

LAND USE & LAND COVER EXPOSED TO FLOOD RETURN PERIOD 100 YEAR



Legend

| | | |
|---|------------------------|-----------------------------------|
| Bare Areas | River and Water Body | Return Period 100 Years: No Flood |
| Bare Areas with Sparse Natural Vegetation | Union Council Boundary | Low |
| Built-up | Tehsil Boundary | Medium |
| Crop in Flood Plain | District Boundary | High |
| Crop Marginal and Irrigated Saline | Provincial Boundary | Very High |
| Crop Rainfed | Line of Control | |
| Crop Irrigated | International Boundary | |
| Forest - Natural Trees and Mangroves | | |
| Natural Vegetation in Wet Areas | | |
| Orchards | | |
| Range Lands - Natural Shrubs and Herbs | | |
| Snow and Glaciers | | |
| Wet Areas | | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

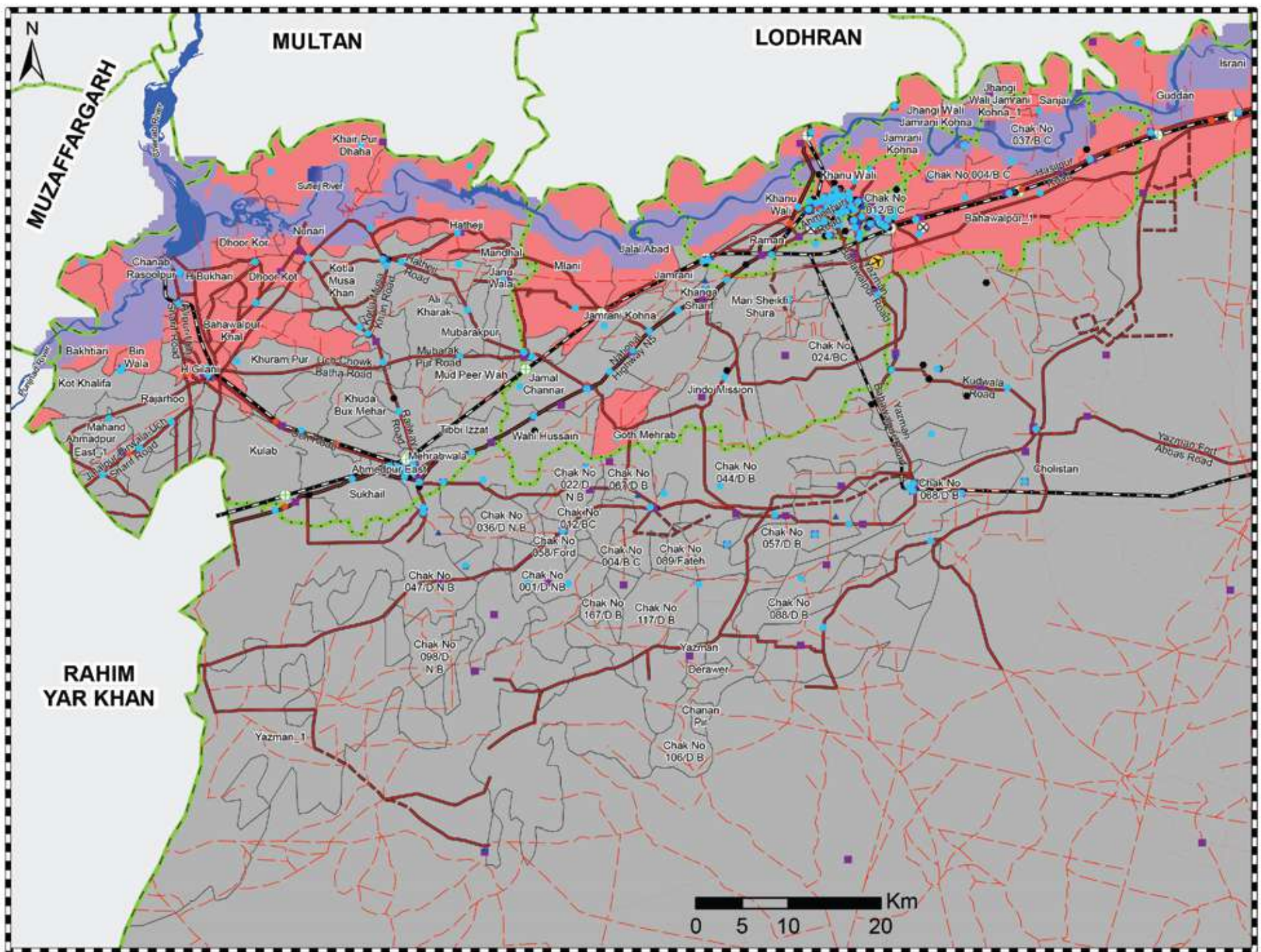
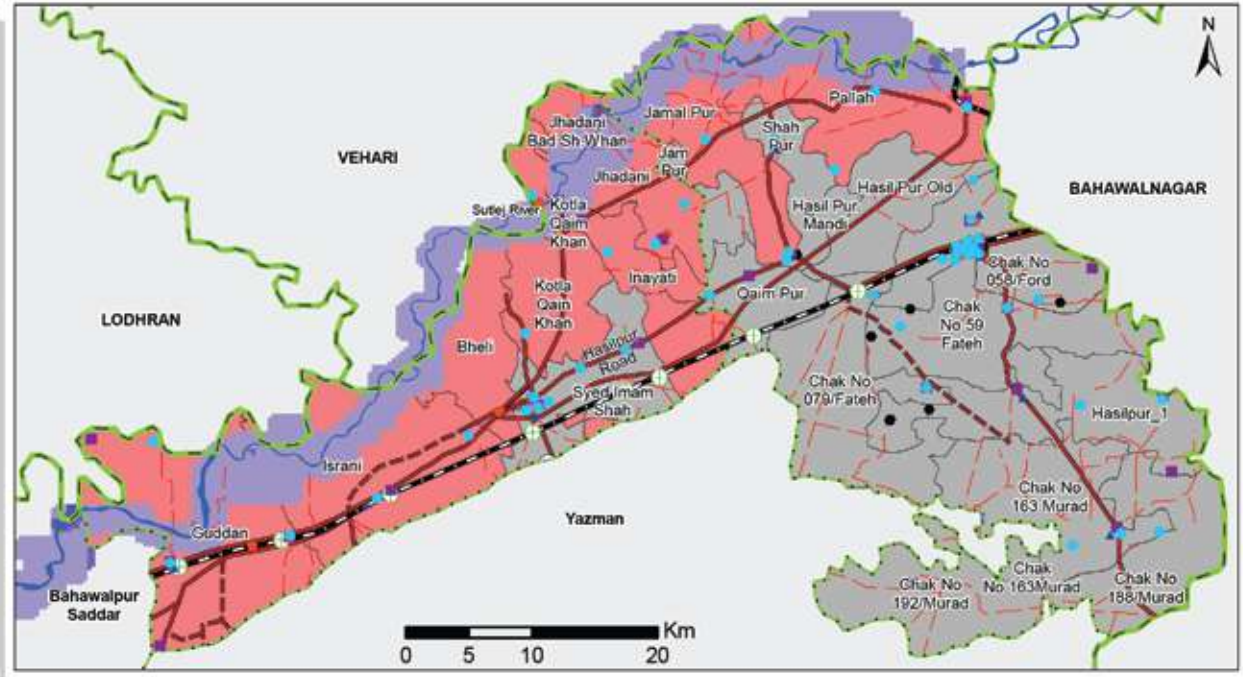
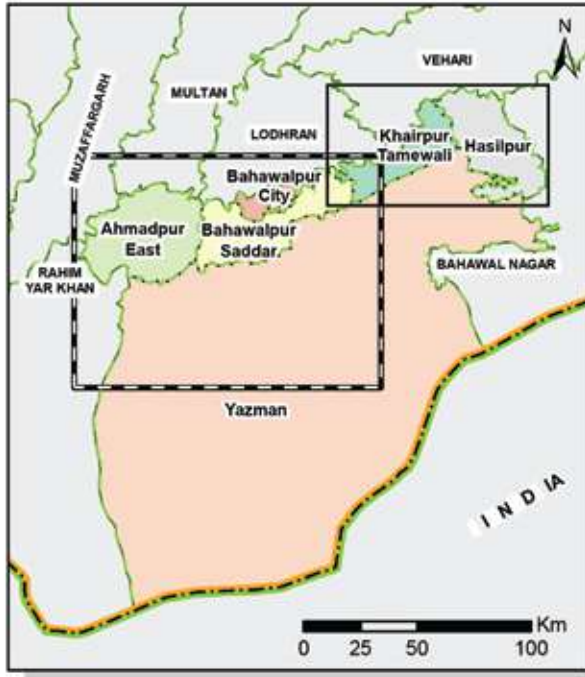
MAP INFORMATION

Data Source(s):
PBS, Govt. of Punjab, Govt. of Pakistan
Hazard Layer-NDMA, Landcover-SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-100-LULC
Prepared by: Project Management Unit, NDMA
Last Updated: 22th June, 2017

COMMUNICATION TOWERS AND TRANSPORTATION NETWORK EXPOSED TO FLOOD 10 YEAR RETURN PERIOD



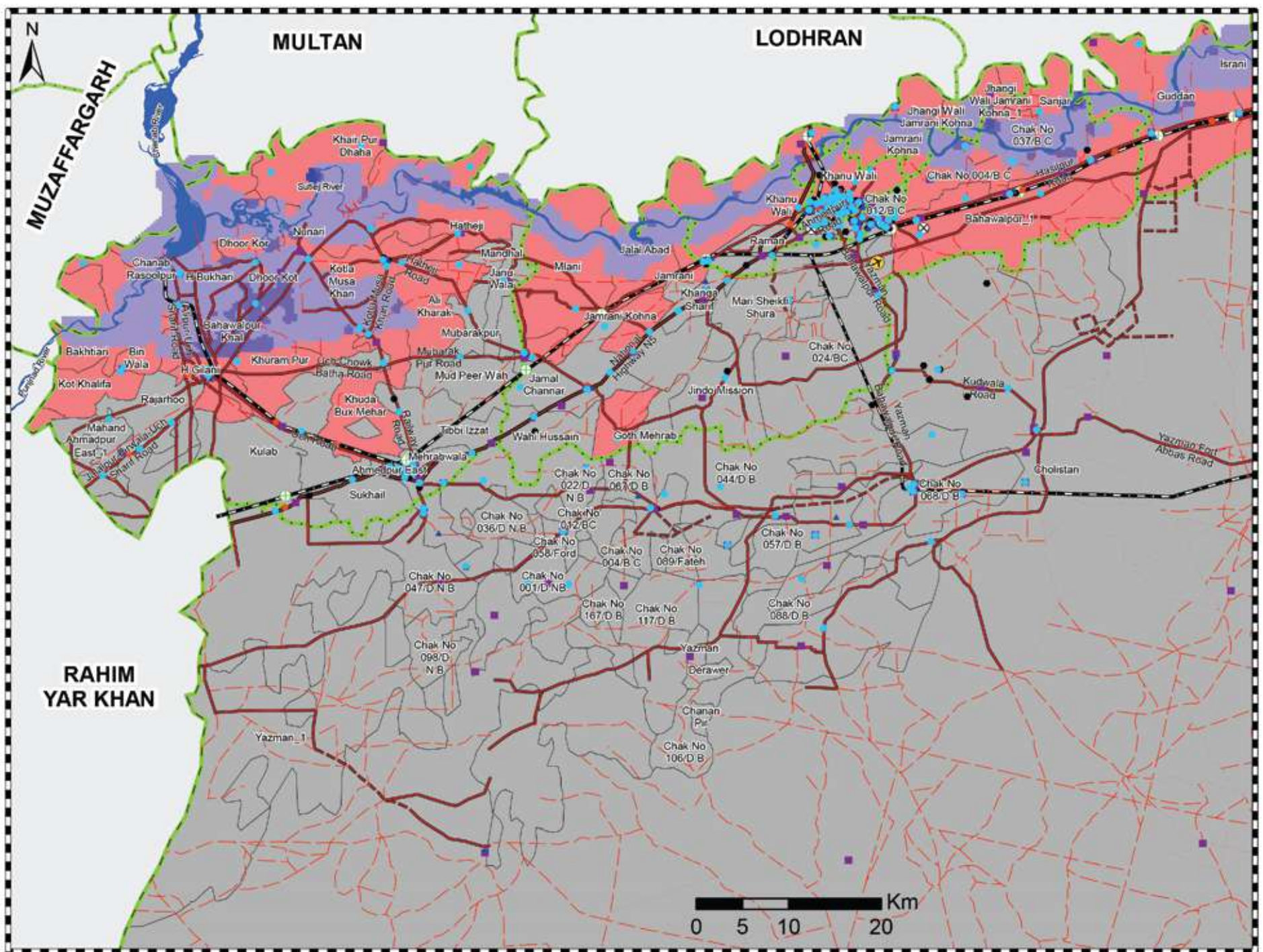
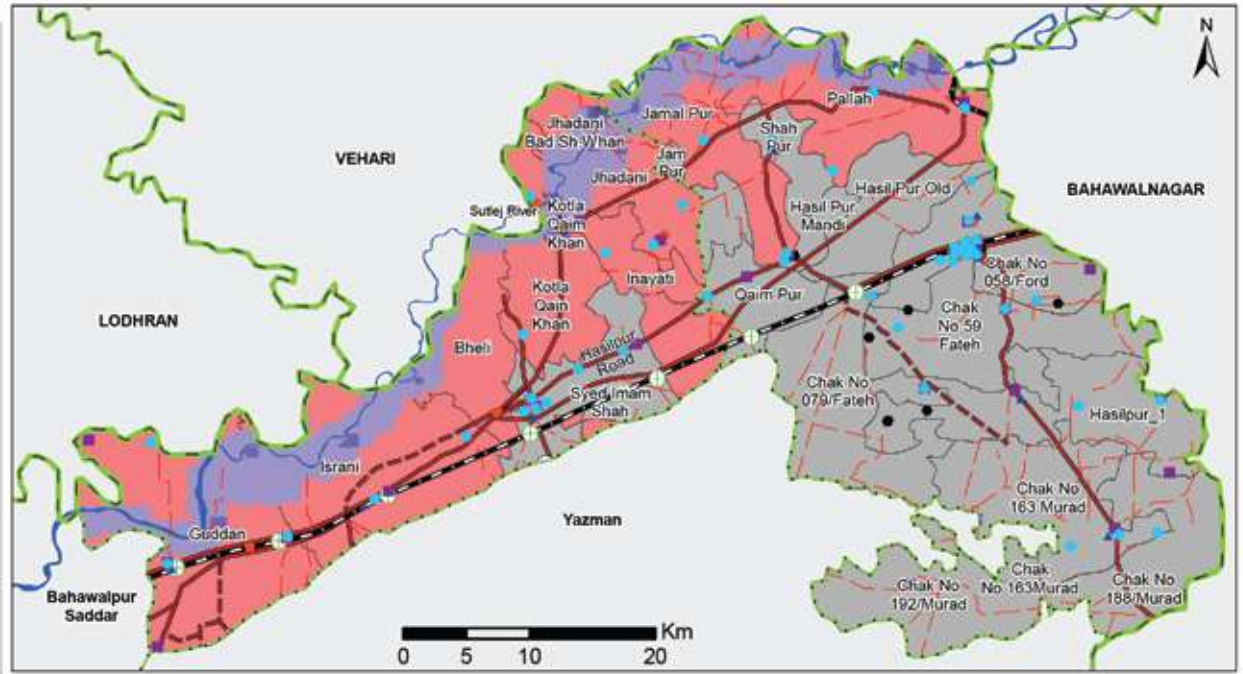
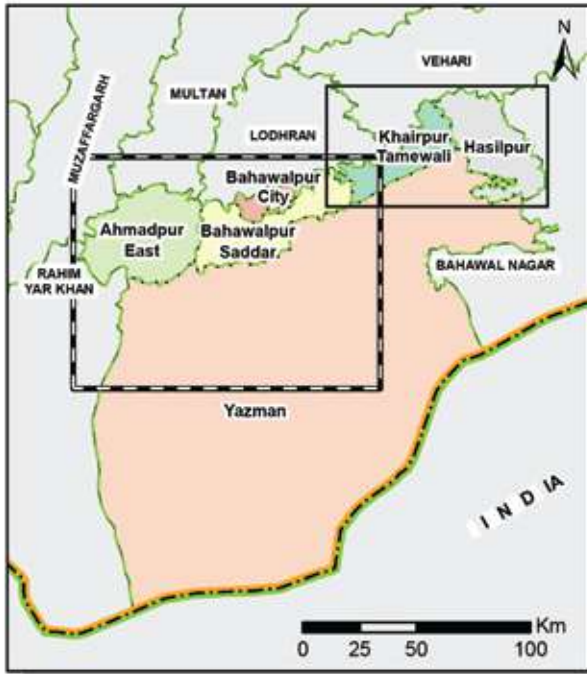
Legend

| | | |
|----------------------------|-----------------------------|--------------------------|
| ● Mobilink | — Bridge | ■ Exposed UCs |
| ■ Telenor | — Super Highway | ■ Unexposed UCs |
| ▲ Ufone | — Metalled | ■ Tehsil Boundary |
| ● Warid | — Unmetalled | ■ District Boundary |
| ● Zong | — Cart track | ■ Provincial Boundary |
| ✈ Airport | — Pack Track | — Line of Control |
| ✈ Air Field/Landing Strips | — Broad Gauge Railway Track | — International Boundary |
| ✈ Railway Station | — Other Gauge Railway Track | |
| ⊗ Bus Station | ■ River and Water Body | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION
Data Source(s):
 Survey of Pakistan
 National Highway Authority
 Pakistan Telecommunication Authority
Datum: WGS 1984
Units: Degree
Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-10-C(TR-CT)
Prepared by: Project Management Unit, NDMA
Last Updated: 10th May, 2017

COMMUNICATION TOWERS AND TRANSPORTATION NETWORK EXPOSED TO FLOOD 50 YEAR RETURN PERIOD



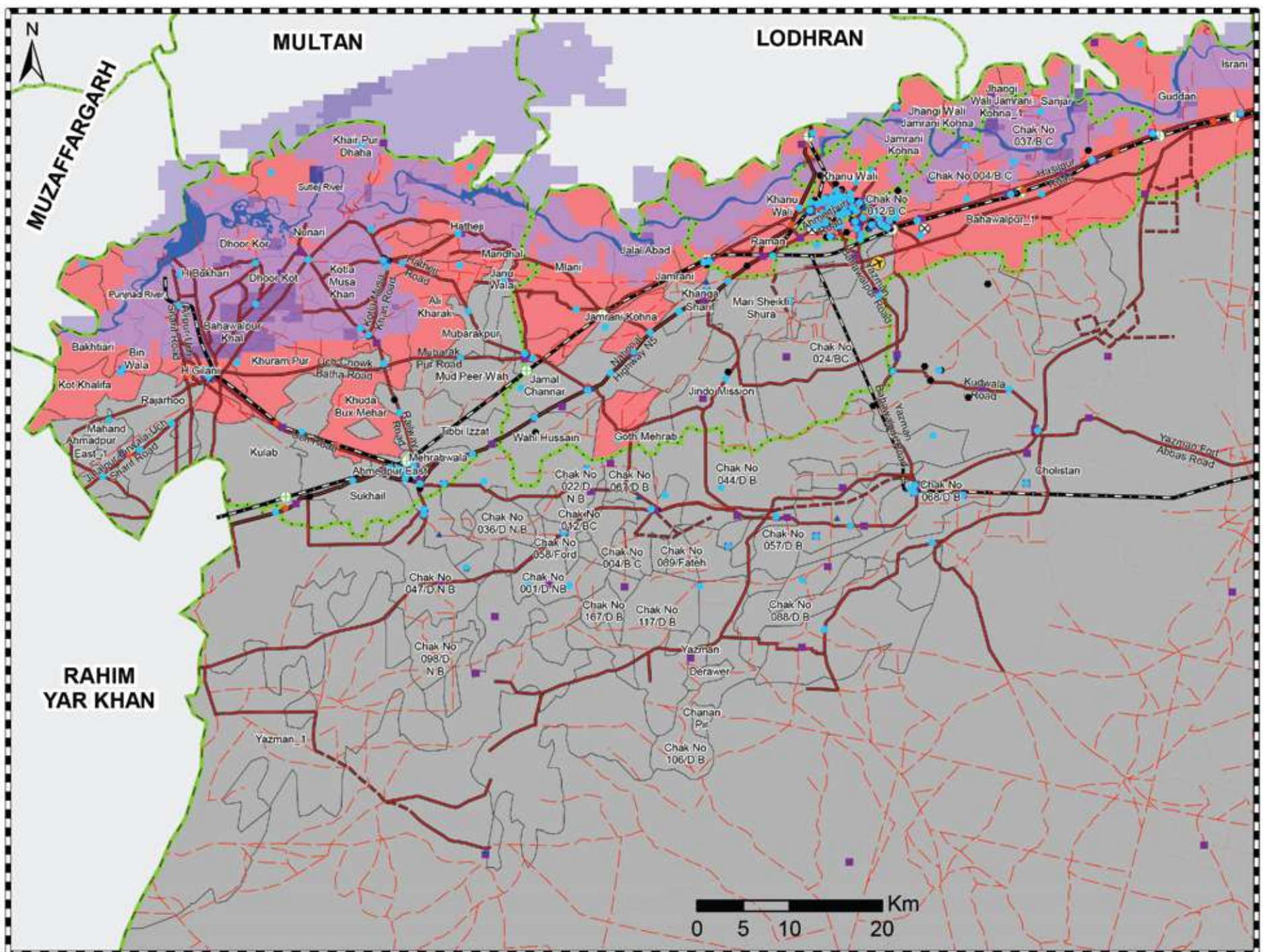
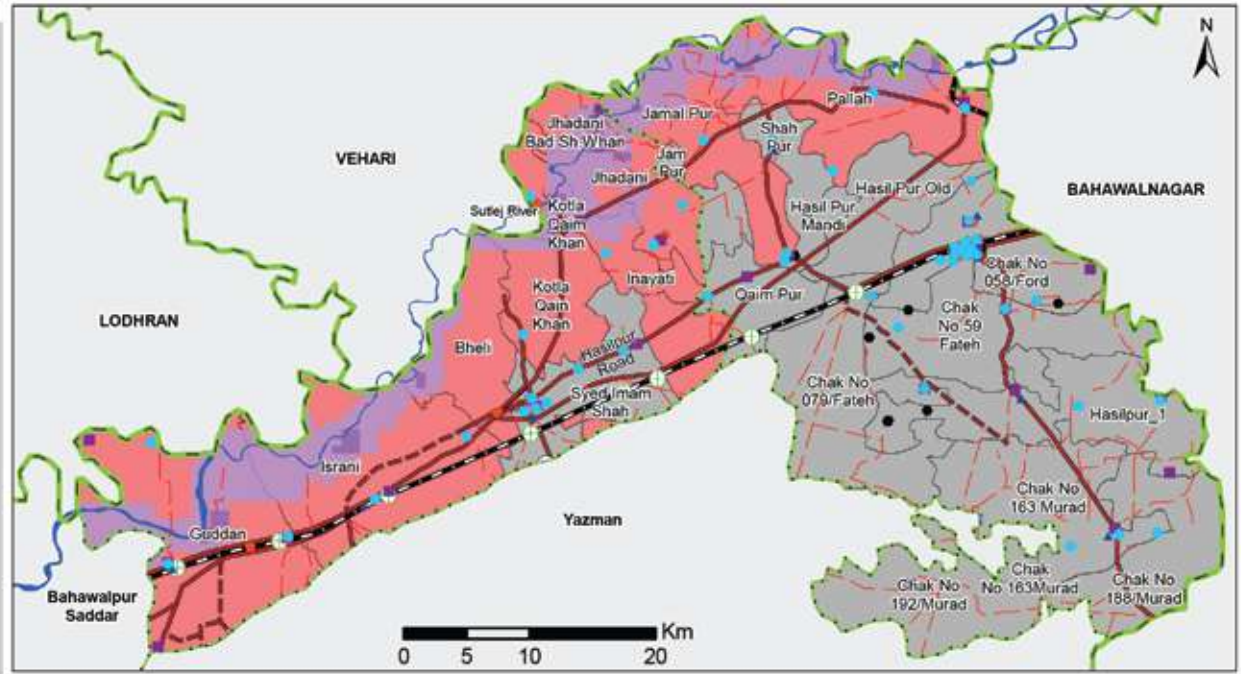
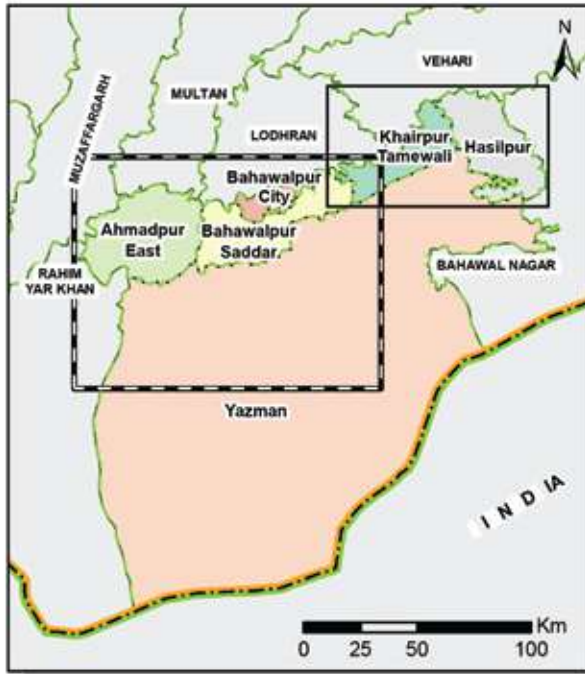
| Legend | | |
|----------------------------|-----------------------------|--------------------------|
| ● Mobilink | — Bridge | Abc Exposed UCs |
| ■ Telenor | — Super Highway | Abc Unexposed UCs |
| ▲ Ufone | — Metalled | Abc Tehsil Boundary |
| ● Warid | --- Unmetalled | ABC District Boundary |
| ● Zong | — Cart track | — Provincial Boundary |
| ✈ Airport | — Pack Track | — Line of Control |
| ✈ Air Field/Landing Strips | — Broad Gauge Railway Track | — International Boundary |
| ⊙ Railway Station | — Other Gauge Railway Track | |
| ⊗ Bus Station | — River and Water Body | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION
 Data Source(s): Survey of Pakistan, National Highway Authority, Pakistan Telecommunication Authority
 Datum: WGS 1984
 Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-50-C(TR-CT)
 Prepared by: Project Management Unit, NDMA
 Last Updated: 10th May, 2017

COMMUNICATION TOWERS AND TRANSPORTATION NETWORK EXPOSED TO FLOOD 100 YEAR RETURN PERIOD



| Legend | |
|----------------------------|-----------------------------|
| ● Mobilink | ⚡ Bridge |
| ■ Telenor | — Super Highway |
| ▲ Ufone | — Metalled |
| ● Warid | - - - Unmetalled |
| ● Zong | - - - Cart track |
| ✈ Airport | — Pack Track |
| ✈ Air Field/Landing Strips | — Broad Gauge Railway Track |
| 🚂 Railway Station | — Other Gauge Railway Track |
| ⊗ Bus Station | ■ River and Water Body |
| | ■ Exposed UCs |
| | ■ Unexposed UCs |
| | ■ Tehsil Boundary |
| | ■ District Boundary |
| | ■ Provincial Boundary |
| | ■ Line of Control |
| | ■ International Boundary |

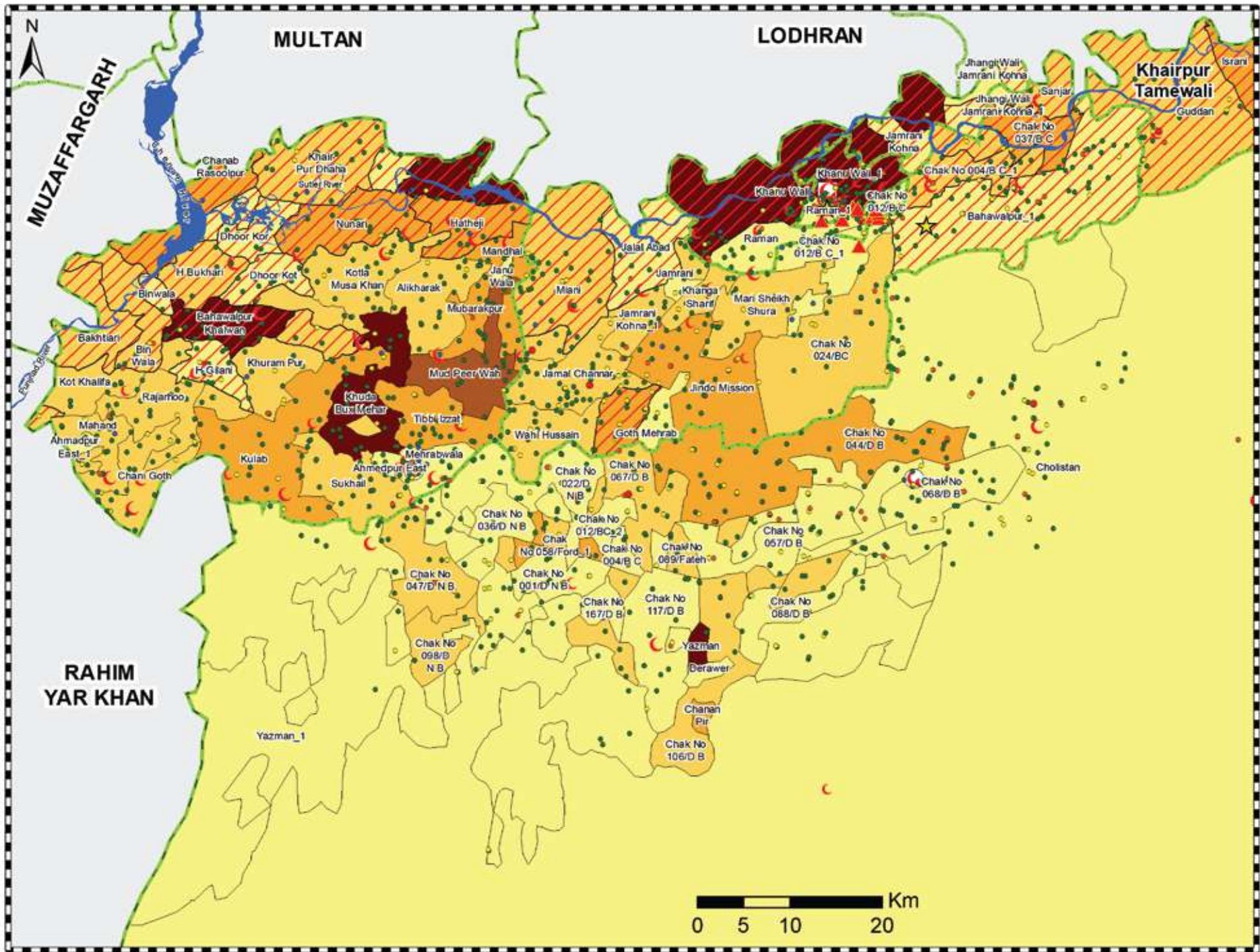
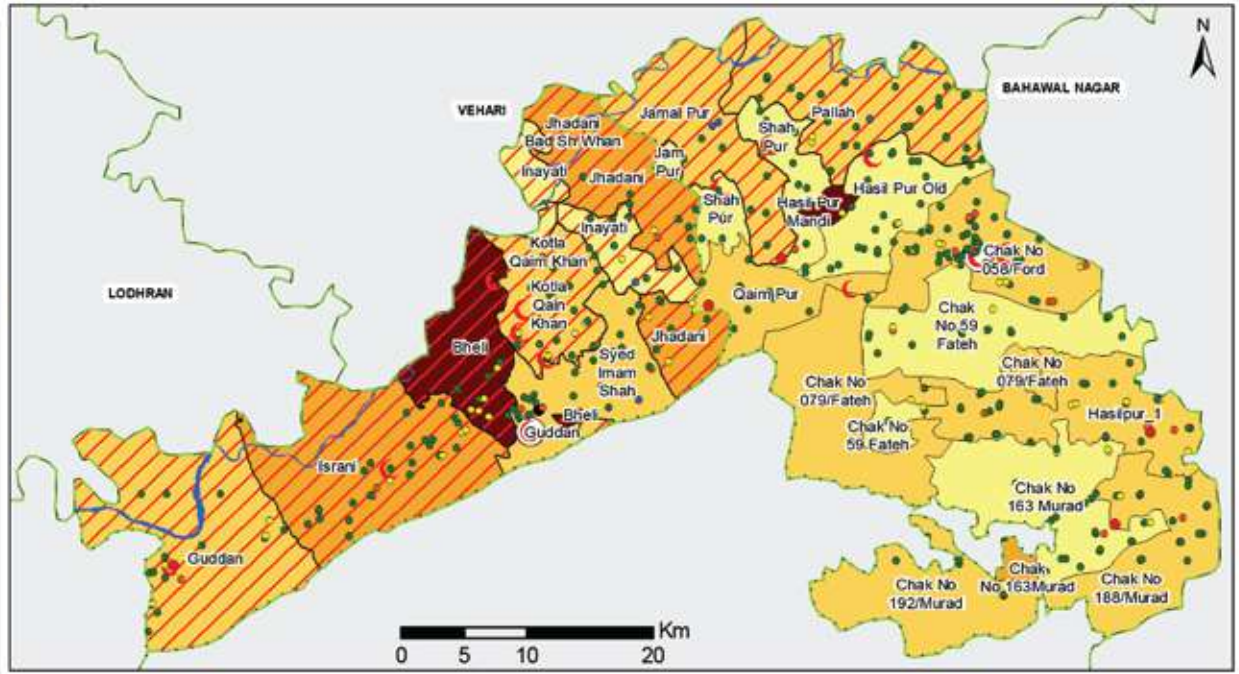
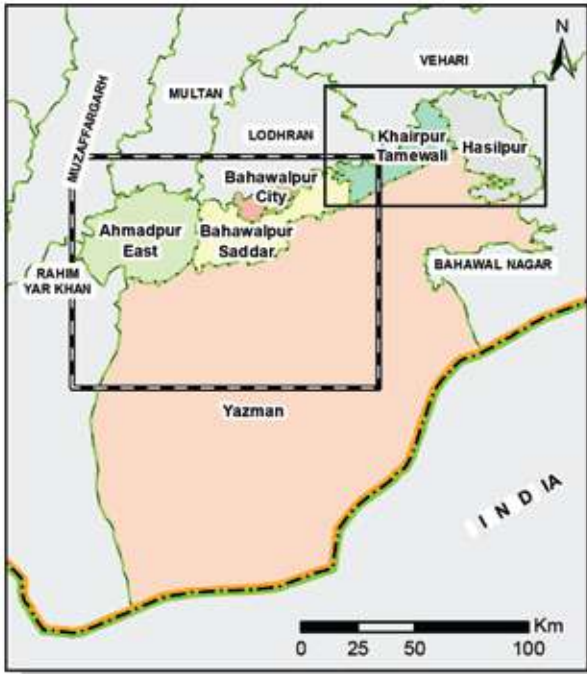
Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION
 Data Source(s):
 Survey of Pakistan
 National Highway Authority
 Pakistan Telecommunication Authority

Datum: WGS 1984
 Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-100-C(TR-CT)
 Prepared by: Project Management Unit, NDMA
 Last Updated: 10th May, 2017

SCHOOLS, HEALTH AND BUILDING EXPOSED TO FLOOD 10 YRP



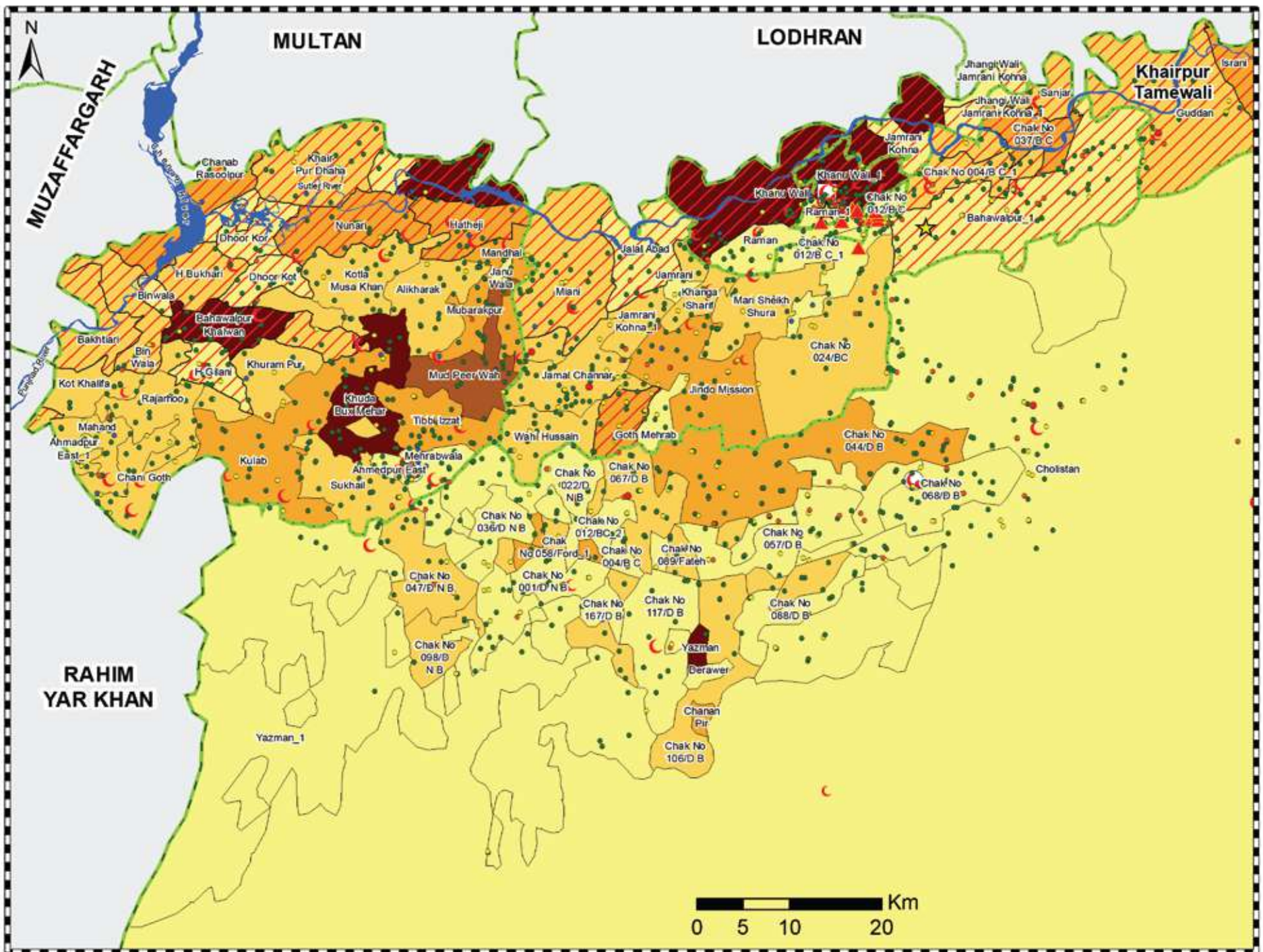
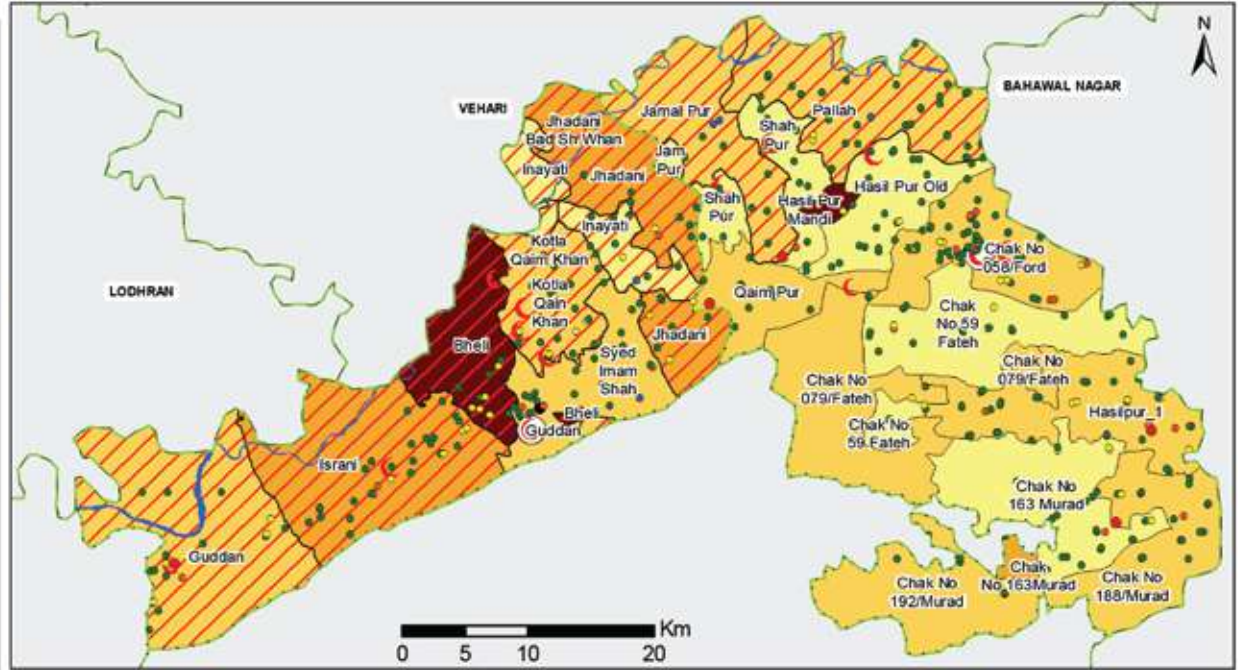
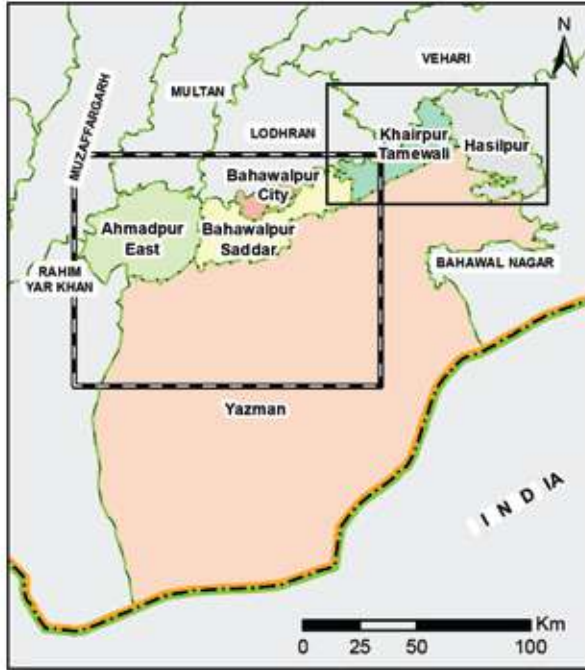
Legend

| | | | | | |
|--|--------------------------------------|------------------------------|----------------------|--|------------------------|
| | District Headquarter Hospital | | High School | | Abc > 10000 |
| | Tehsil Headquarter Hospital | | Middle School | | Exposed UCs |
| | Civil Hospital & Tuberculosis Clinic | | Primary School | | River and Water Body |
| | Basic Health Unit | | Masjib/Maktab School | | Abc Tehsil Boundary |
| | Rural Health Centre | Building Distribution | | | ABC District Boundary |
| | Maternal/Child Health Centre | | Abc < 4000 | | Provincial Boundary |
| | University | | Abc 4000 - 6000 | | Line of Control |
| | College | | Abc 6000 - 8000 | | International Boundary |
| | Higher Secondary School | | Abc 8000 - 10000 | | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION
 Data Source(s):
 Pakistan Bureau of Statistics
 School Education Department
 World Health Organization
 Health Department Punjab
 Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-10-C(HF-EF-BD)
 Prepared by: Project Management Unit, NDMA
 Last Updated: 20th April, 2017

SCHOOLS, HEALTH AND BUILDING EXPOSED TO FLOOD 50 YRP



Legend

| | | |
|--------------------------------------|------------------------------|------------------------|
| District Headquarter Hospital | High School | > 10000 |
| Tehsil Headquarter Hospital | Middle School | Exposed UCs |
| Civil Hospital & Tuberculosis Clinic | Primary School | River and Water Body |
| Basic Health Unit | Masjid/Maktab School | Tehsil Boundary |
| Rural Health Centre | Building Distribution | District Boundary |
| Maternal/Child Health Centre | < 4000 | Provincial Boundary |
| University | 4000 - 6000 | Line of Control |
| College | 6000 - 8000 | International Boundary |
| Higher Secondary School | 8000 - 10000 | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

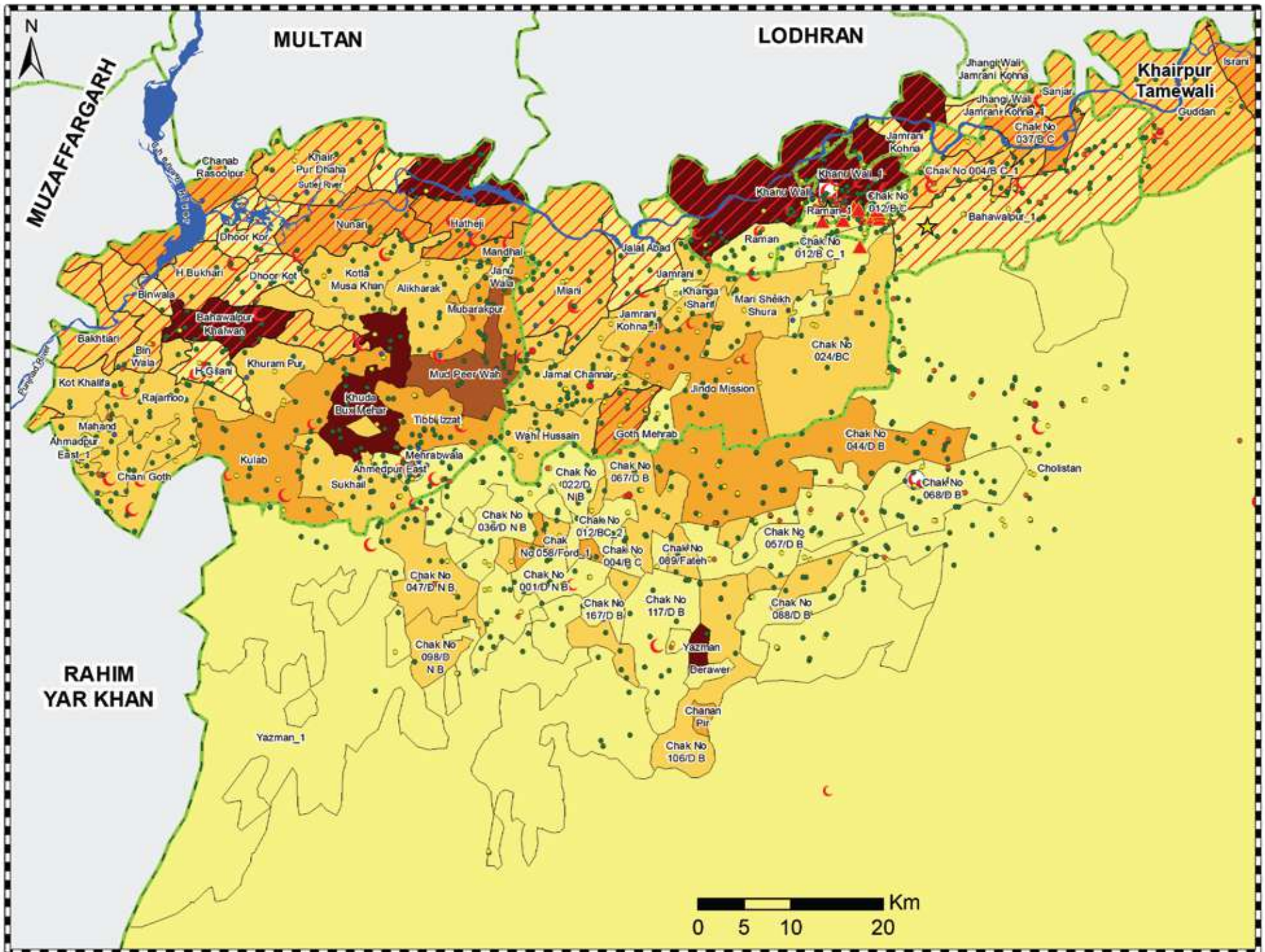
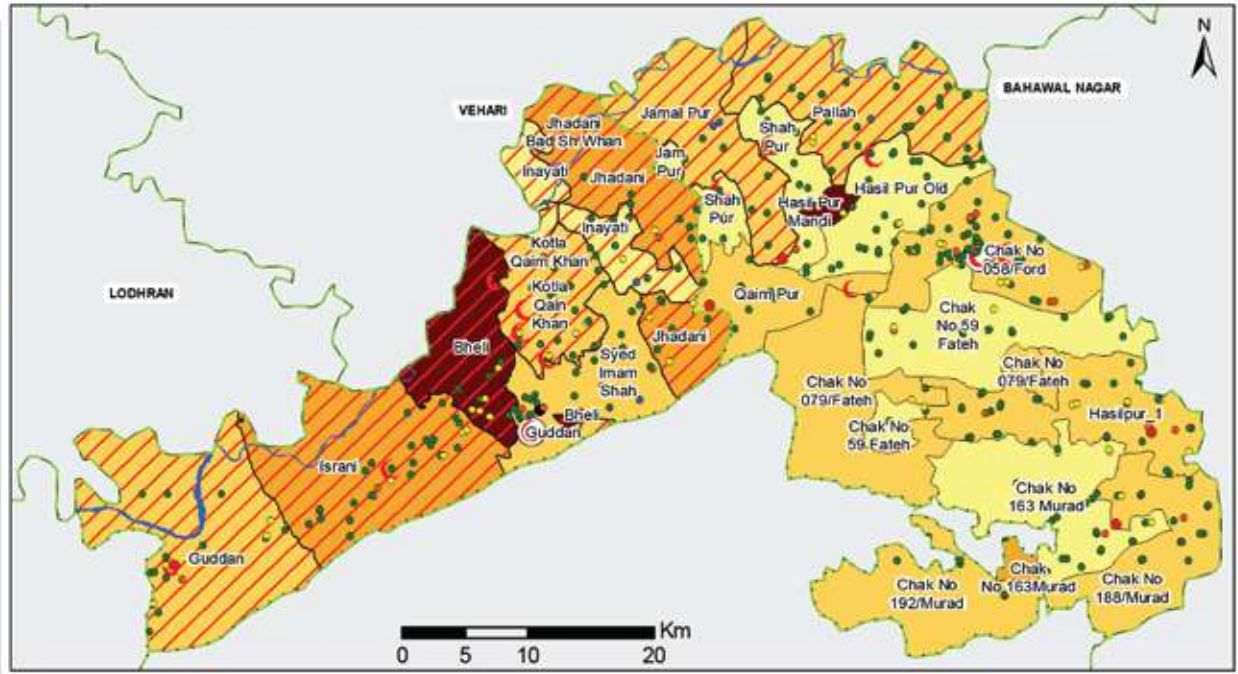
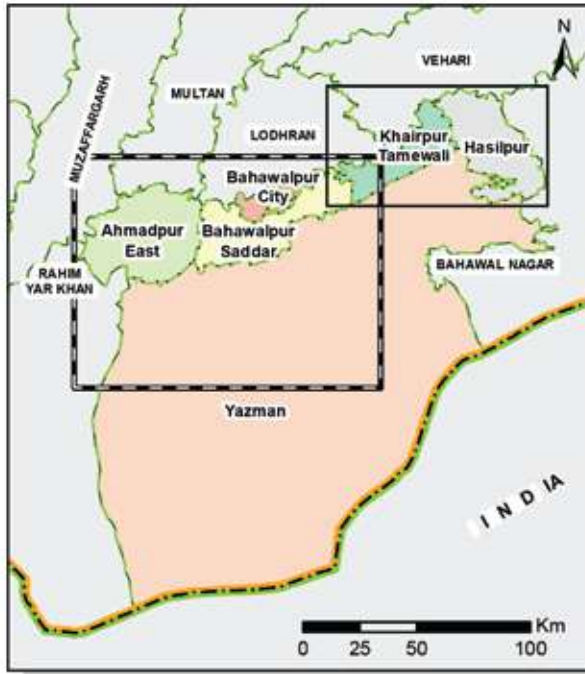
MAP INFORMATION

Data Source(s):
 Pakistan Bureau of Statistics
 School Education Department
 World Health Organization
 Health Department Punjab

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-50-C(HF-EF-BD)
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

SCHOOLS, HEALTH AND BUILDING EXPOSED TO FLOOD 100 YRP



Legend

| | | |
|--------------------------------------|------------------------------|------------------------|
| District Headquarter Hospital | High School | > 10000 |
| Tehsil Headquarter Hospital | Middle School | Exposed UCs |
| Civil Hospital & Tuberculosis Clinic | Primary School | River and Water Body |
| Basic Health Unit | Masjid/Maktab School | Tehsil Boundary |
| Rural Health Centre | | District Boundary |
| Maternal/Child Health Centre | Building Distribution | Provincial Boundary |
| University | < 4000 | Line of Control |
| College | 4000 - 6000 | International Boundary |
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| | 8000 - 10000 | |

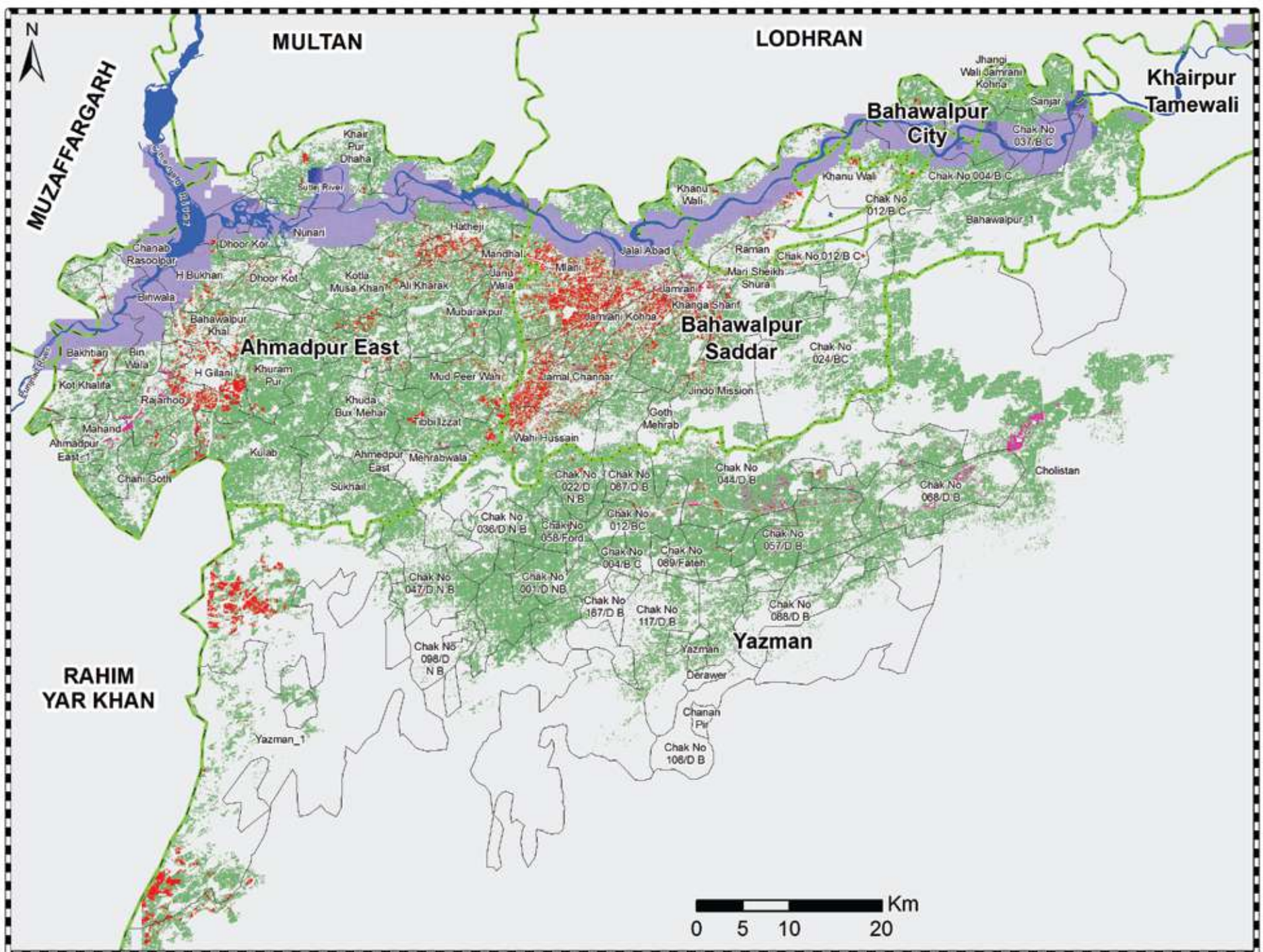
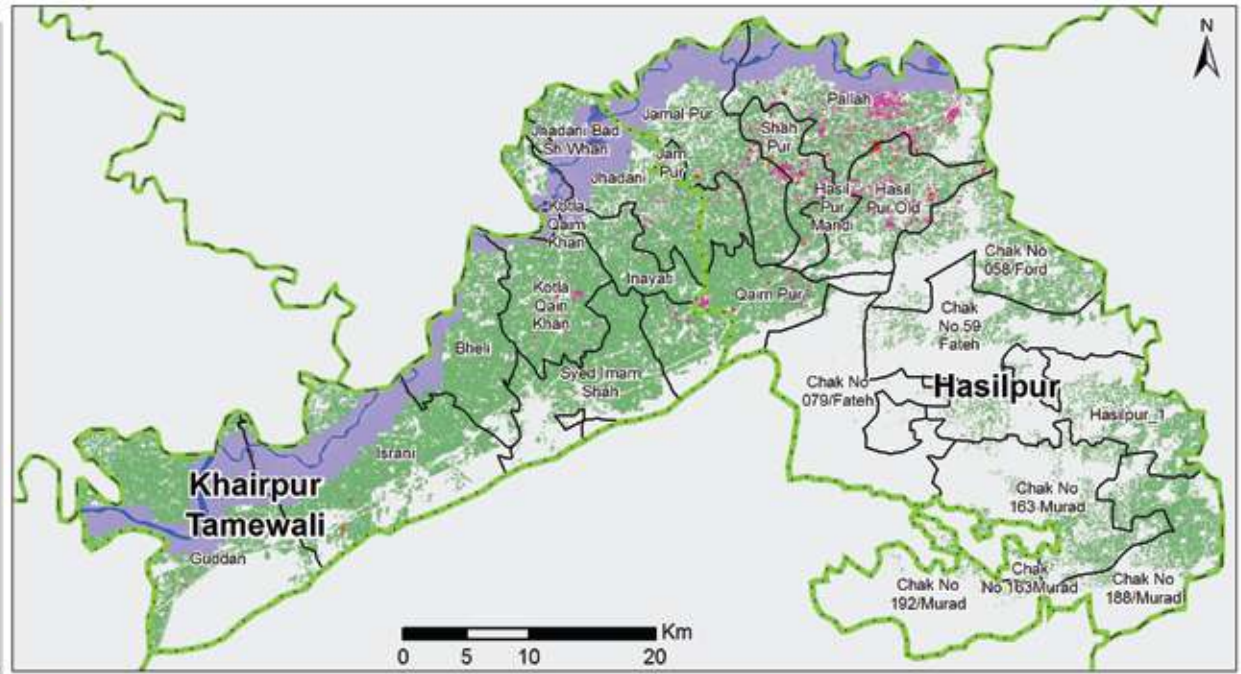
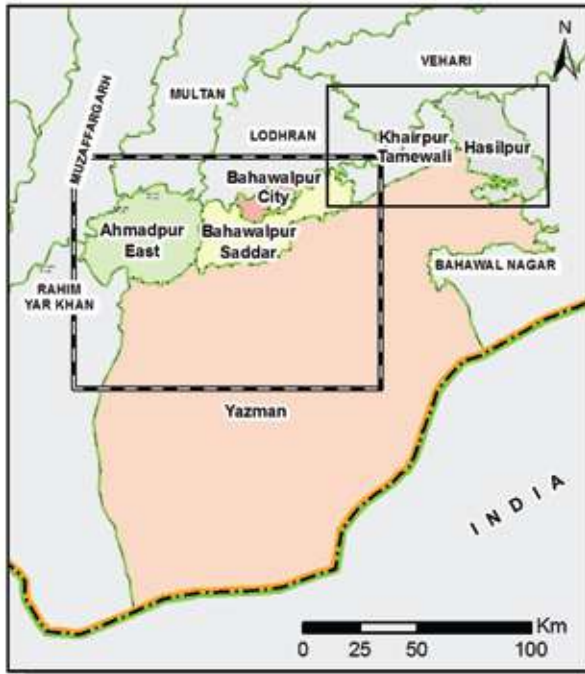
Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
 Pakistan Bureau of Statistics
 School Education Department
 World Health Organization
 Health Department Punjab

Datum: WGS 1984
 Units: Degree
 Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-100-C(HF-EF-BD)
 Prepared by: Project Management Unit, NDMA
 Last Updated: 20th April, 2017

CROP EXPOSED TO FLOOD RETURN PERIOD 10 YEARS (KHARIF SEASON)



| Legend | | Return Period 10 Years | |
|--------|------------------------|------------------------|-----------|
| | Rice | | No Flood |
| | Sugarcane | | Low |
| | Cotton | | Medium |
| | River and Water Body | | High |
| | Union Council Boundary | | Very High |
| | Tehsil Boundary | | |
| | District Boundary | | |
| | Provincial Boundary | | |
| | Line of Control | | |
| | International Boundary | | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

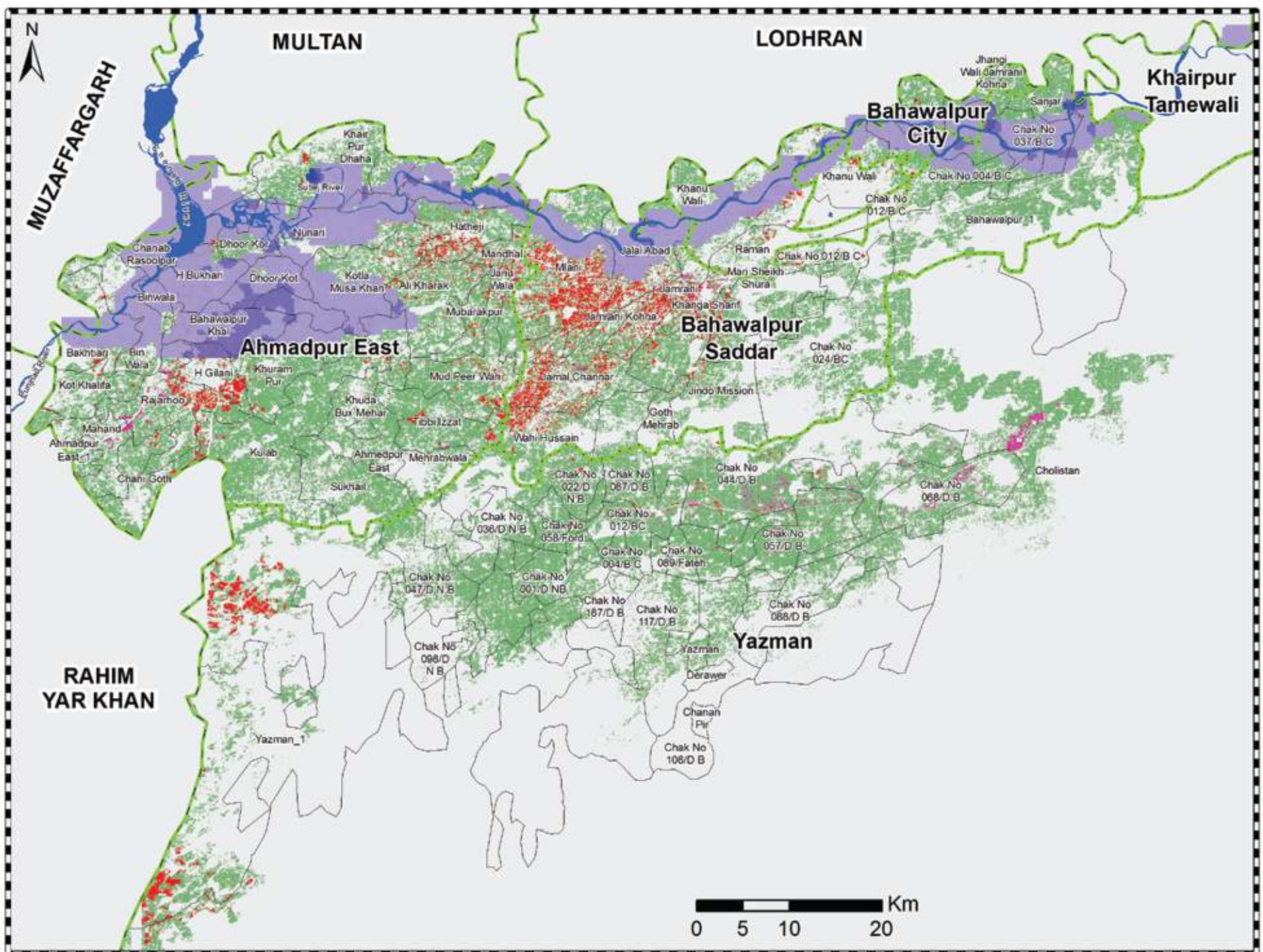
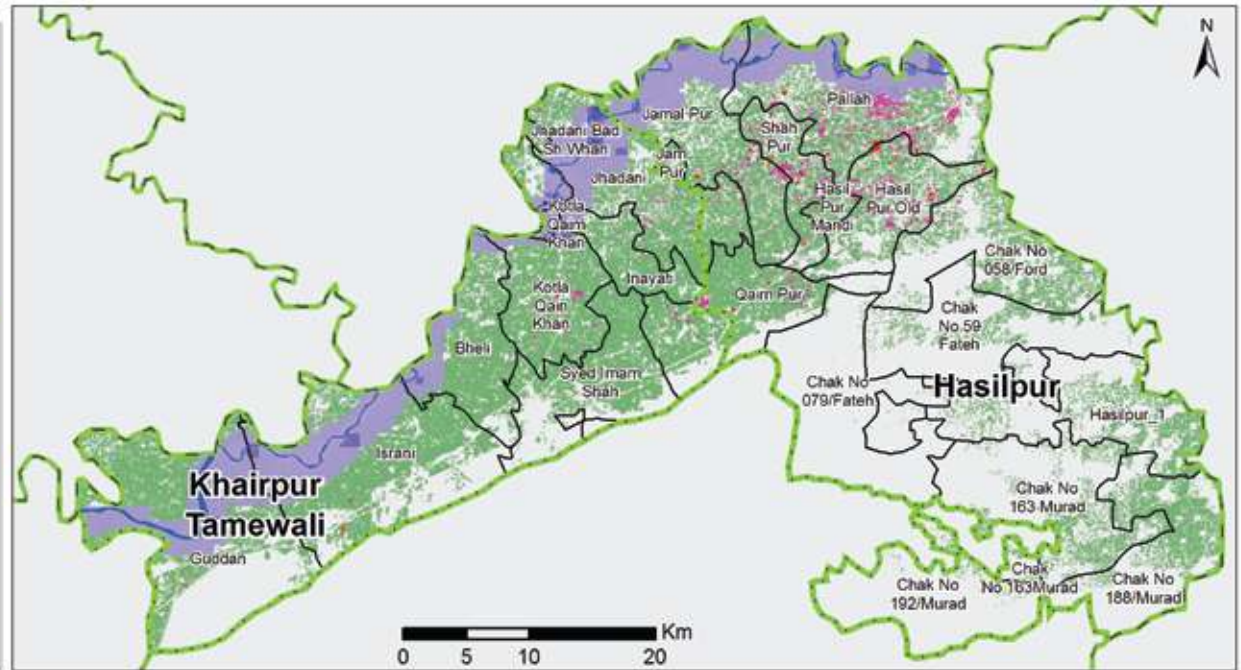
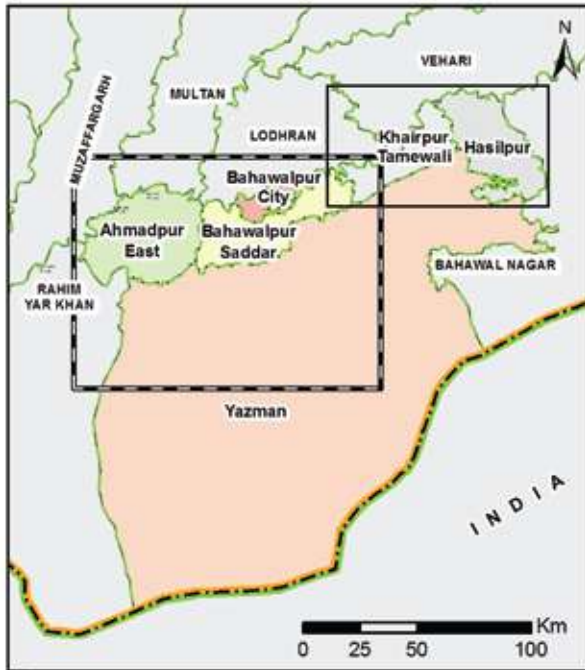
MAP INFORMATION

Data Source(s):
 PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Crop Mask-SUPARCO

Datum: WGS 1984
 Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-10-KH-CROPS
 Prepared by: Project Management Unit, NDMA
 Last Updated: 22th June, 2017

CROP EXPOSED TO FLOOD RETURN PERIOD 50 YEARS (KHARIF SEASON)



| Legend | | Return Period 50 Years | |
|---|--|---|--|
| Rice | River and Water Body | No Flood | Low |
| Sugarcane | Abc Union Council Boundary | Medium | High |
| Cotton | Abc Tehsil Boundary | Very High | |
| | ABC District Boundary | | |
| | Provincial Boundary | | |
| | Line of Control | | |
| | International Boundary | | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

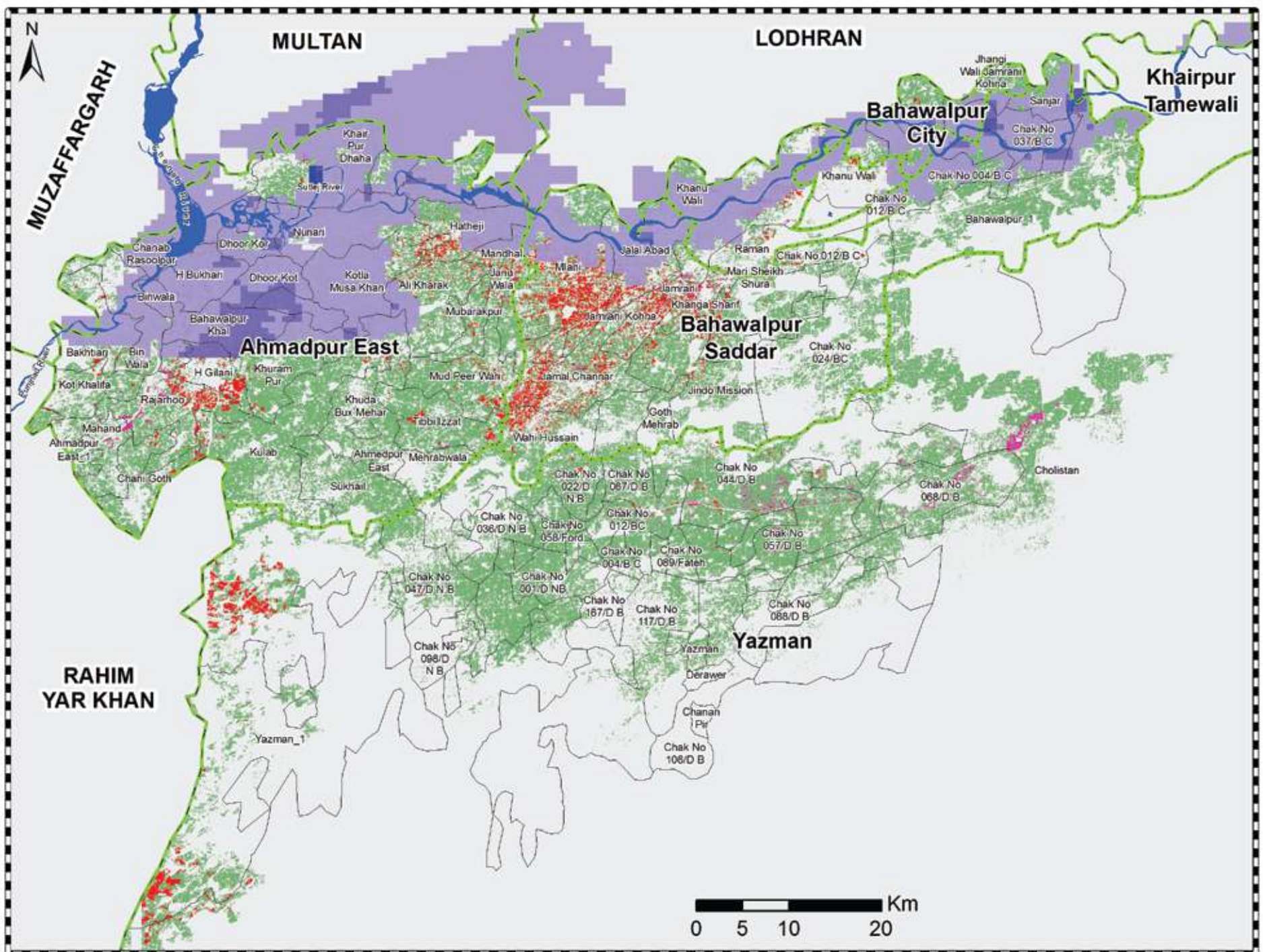
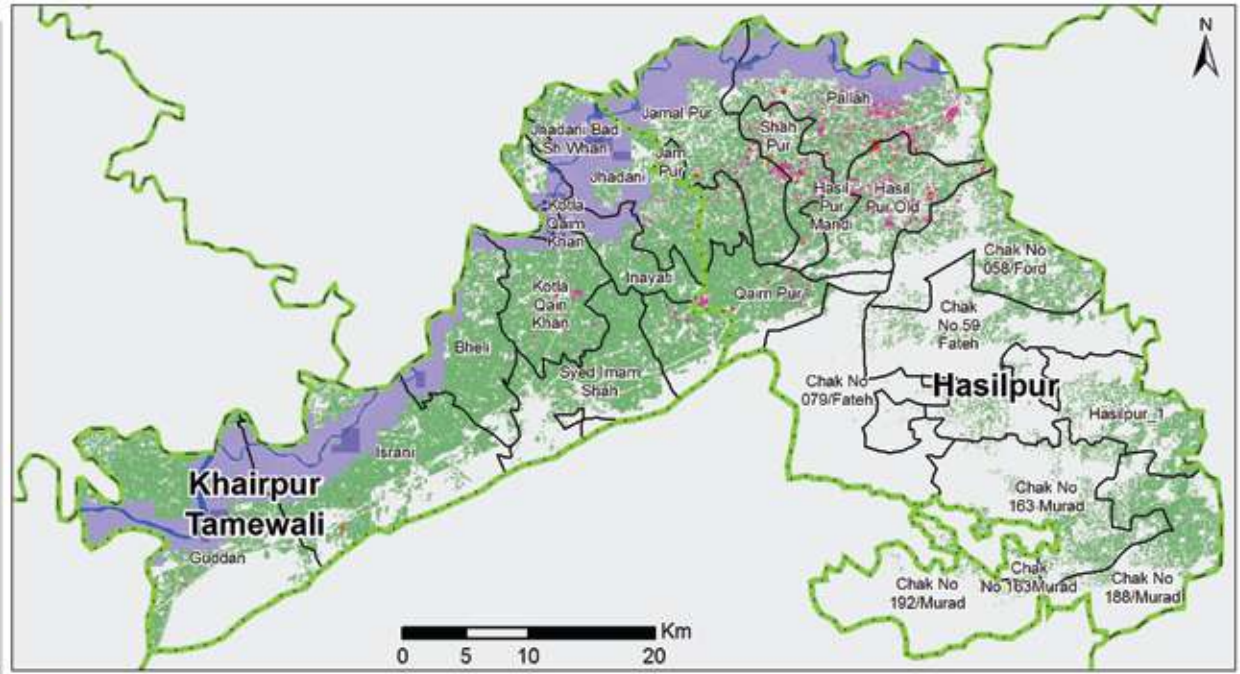
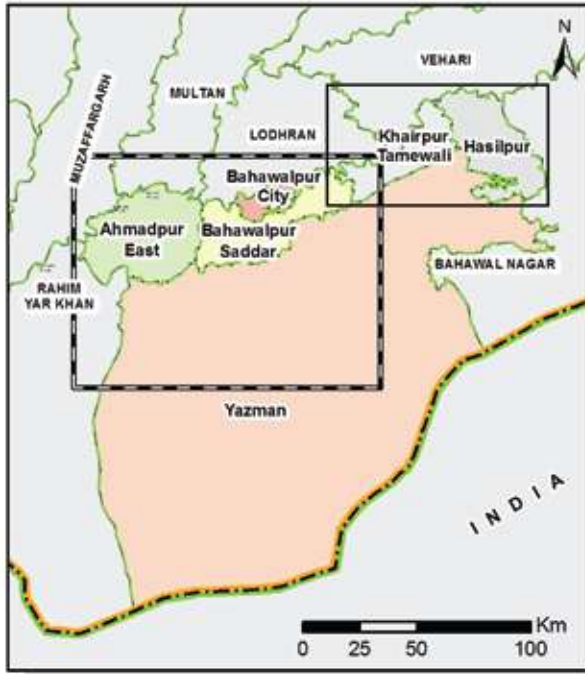
MAP INFORMATION

Data Source(s):
PBS, Govt. of Punjab, Govt. of Pakistan
Hazard Layer-NDMA, Crop Mask-SUPARCO

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-50-KH-CROPS
Prepared by: Project Management Unit, NDMA
Last Updated: 22th June, 2017

CROP EXPOSED TO FLOOD RETURN PERIOD 100 YEARS (KHARIF SEASON)



| Legend | | Return Period 100 Years | |
|-----------|------------------------|-------------------------|------|
| Rice | River and Water Body | No Flood | Low |
| Sugarcane | Union Council Boundary | Medium | High |
| Cotton | Tehsil Boundary | Very High | |
| | District Boundary | | |
| | Provincial Boundary | | |
| | Line of Control | | |
| | International Boundary | | |

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

MAP INFORMATION

Data Source(s):
 PBS, Govt. of Punjab, Govt. of Pakistan
 Hazard Layer-NDMA, Crop Mask-SUPARCO

Datum: WGS 1984
 Units: Degree

Map No: MHVRA-PUN-603-APR-2016-EXP-04-NDMA-100-KH-CROPS
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 Last Updated: 22th June, 2017



D

VULNERABILITY ASSESSMENT

- SOCIAL VULNERABILITY
- FODD SECURITY



26 SOCIAL VULNERABILITY ASSESSMENT

Vulnerability Assessment has been undertaken in terms of:

- (a) Physical Dimension (b) Social Aspects (c) Agro based Food Security

Exposure is defined as the interaction of element at risk and hazard. The hazard severity, extent or magnitude of various return periods indicates the degree to which the elements at risk are exposed to a particular hazard. Primary and secondary sources were used for exposure analysis and it was performed by overlaying hazard information with elements at risk. Elements at risks were considered in the dimensions of population, building, essential & critical infrastructures and livelihood.

Physical Vulnerability Analysis (PVA)

For fragility analysis of buildings the structures are classified into engineered and non-engineered constructions. The engineered structures are analyzed by conducting laboratory experiments on building constituent materials such as brick units, mortar, brick assemblages, brick panels and brick walls for masonry structures and concrete cylinders, reinforcing steel bars, structural beam-column members for reinforced concrete structures. However, the complexity of non-engineered buildings, that depend solely on material properties are not reliable owing to the complexity of structure for modeling. On National scale the construction typologies in Pakistan are primarily based on the type of material used in the construction of walls, floors and roof, and the overall construction quality of a structure typology.

Based on the type used according to EMS-98 the building vulnerability scoring for earthquake and flood hazard are given below where fragility against earthquake is calculated using shake table test and numerical analysis approach, while flood vulnerability scoring is based on historical damage statistics.

Building Vulnerability Scoring

| Building Types | EMS-98 | Vulnerability Score | |
|-------------------------|--------|---------------------|-------------|
| | | Floods | Earthquakes |
| Reinforced Concrete | RC1 | 2.5 | 3.09 |
| Stone Masonry | M1 | 5.4 | 5.56 |
| Mud/Adobe Masonry | M2 | 7.14 | 7.14 |
| Brick Masonry | M5 | 3.66 | 3.79 |
| Wood/Bamboo Traditional | M7 | 4.82 | 2.50 |
| Block Masonry | M8 | 4.24 | 5.00 |
| Others Undefined | 00 | 5 | 6.25 |

Building Vulnerability Scoring as per PBS Classification

| Building Types | Floods | Earthquakes |
|----------------|--------|-------------|
| Kaccha | 6.5 | 7 |
| Semi-Pacca | 5.0 | 6 |
| Pacca | 2.5 | 3 |

The damage state of building material based on the repair cost ratio i.e. the ratio of the cost of repair to the total building cost is given below.

| Damage State | Repair Cost Ratio |
|--------------|-------------------|
| Slight | 0 - 5% |
| Moderate | 5 - 20% |
| Heavy | 20 - 50% |
| Severe | 50 - 100% |

Buildings Surveyed for Physical Vulnerability Assessment



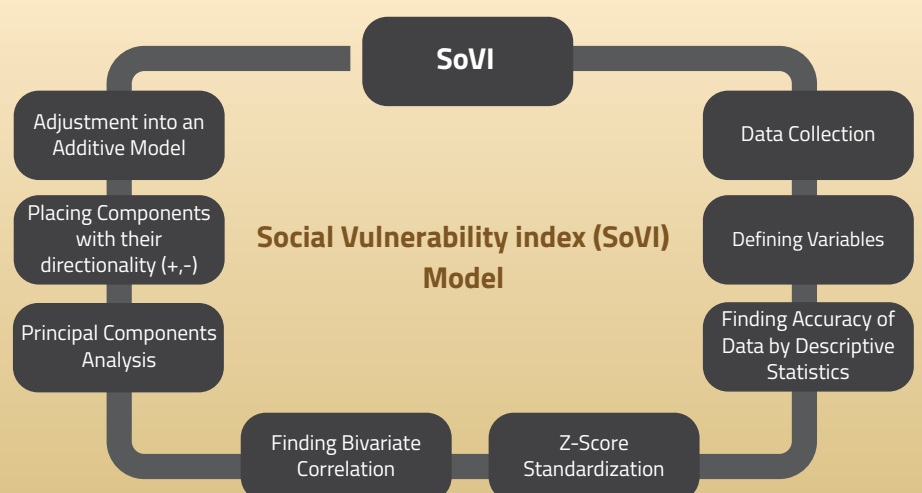
Social Vulnerability Assessment (SVA)

The Social Vulnerability Assessment focuses on the vulnerability characterization of communities, considering both the vulnerabilities of physical systems and the social conditions that can increase or decrease the impact of disasters in the considered area. The assessment is based on susceptibility of populations to loss, which is quantified using the methodology known as Social Vulnerability Index (SoVI). The SoVI for District Khushab is given in the table below.

| Factors | Component | Directionality | Variance Observed(%) |
|---------|--|----------------|----------------------|
| 1 | Age, Education, Health Outcome, Socioeconomic Status | Positive | 29.76% |
| 2 | Rural Farm Populations | Positive | 12.5% |
| 3 | Information Access | Negative | 6.9% |
| 4 | Children with Disabilities | Positive | 5.99% |
| 5 | Social Benefits | Negative | 5.66% |
| 6 | Infant safety | Negative | 5.61% |
| 7 | Low income laborers | Positive | 5.31% |
| 8 | Poverty/Need for External Income Source | Positive | 5.22% |
| 9 | Preventative Health Measures | Negative | 5% |

To obtain a final composite score of social vulnerability, the factors were added to obtain the aggregated factor i.e. the Social Vulnerability Index for each of the District:

$$\text{SoVI Score} = \text{Factor 1} + \text{Factor 2} + \text{Factor 3} + \text{Factor 4} + \text{Factor 5} + \text{Factor 6} + \text{Factor 7} + \text{Factor 8} + \text{Factor 9}$$



FOOD SECURITY AGAINST DROUGHT

| Tehsil | Union Council | Drought Severity Score | Area of UC (sq.km) | Agricultural Land (sq.km) | %age of Agri to Total Land | Food Insecurity | Food Insecurity Ranking |
|-------------------|-----------------------------|------------------------|--------------------|---------------------------|----------------------------|-----------------|-------------------------|
| Hasilpur | Chak No 058/ford | 5 | 88.29 | 63.68 | 72.13% | 36,067 | 5 |
| Khairpur Tamewali | Inayati | 4 | 48.00 | 43.40 | 90.42% | 36,169 | 5 |
| Ahmadpur East | Kulab | 4 | 128.49 | 116.99 | 91.05% | 36,420 | 5 |
| Ahmadpur East | Chanab Rasool Pur | 5 | 49.50 | 36.67 | 74.08% | 37,040 | 5 |
| Khairpur Tamewali | Israni | 5 | 157.86 | 117.21 | 74.25% | 37,126 | 5 |
| Ahmadpur East | Bahawalpur Khalwan | 4 | 87.80 | 82.85 | 94.35% | 37,741 | 5 |
| Ahmadpur East | H Bukhari | 4 | 38.96 | 37.11 | 95.26% | 38,106 | 5 |
| Bahawalpur | Jamal Channar | 4 | 67.57 | 64.45 | 95.38% | 38,153 | 5 |
| Ahmadpur East | Khurampur | 4 | 71.29 | 68.30 | 95.81% | 38,322 | 5 |
| Hasilpur | Shah Pur | 4 | 55.27 | 53.10 | 96.07% | 38,430 | 5 |
| Ahmadpur East | Rajarhoo | 4 | 51.80 | 50.67 | 97.82% | 39,128 | 5 |
| Ahmadpur East | Mandhal | 4 | 18.19 | 18.11 | 99.58% | 39,831 | 5 |
| Hasilpur | Qaim Pur | 5 | 52.95 | 43.75 | 82.61% | 41,307 | 5 |
| Yazman | Chak No 001/d N B | 5 | 45.73 | 41.34 | 90.39% | 45,196 | 5 |
| Ahmadpur East | Dhoor Kor | 5 | 28.52 | 27.11 | 95.08% | 47,540 | 5 |
| Ahmadpur East | Hatheji | 5 | 46.63 | 45.40 | 97.36% | 48,681 | 5 |
| Yazman | Chak No 098/d N B | 4 | 55.46 | 38.35 | 69.15% | 27,662 | 4 |
| Bahawalpur City | Jhangi Wali Jamrani Kohna | 3 | 8.54 | 7.90 | 92.41% | 27,724 | 4 |
| Bahawalpur | Goth Mehrab | 4 | 18.18 | 12.66 | 69.61% | 27,842 | 4 |
| Bahawalpur | Mari Sheikh Shijra | 4 | 63.81 | 44.94 | 70.43% | 28,173 | 4 |
| Yazman | Chak No 068/d B | 4 | 96.22 | 68.00 | 70.67% | 28,270 | 4 |
| Bahawalpur | Jindo Misson | 4 | 107.87 | 77.01 | 71.39% | 28,556 | 4 |
| Yazman | Chak No 022/d N B | 4 | 71.88 | 51.37 | 71.47% | 28,587 | 4 |
| Ahmadpur East | Kot Khalifa | 3 | 42.42 | 41.94 | 98.86% | 29,657 | 4 |
| Ahmadpur East | Chani Goth | 4 | 50.85 | 38.53 | 75.78% | 30,310 | 4 |
| Khairpur Tamewali | Guddan | 5 | 175.07 | 107.46 | 61.38% | 30,691 | 4 |
| Bahawalpur | Wahi Hussain | 4 | 49.60 | 38.81 | 78.25% | 31,298 | 4 |
| Yazman | Chak No 036/d N B | 4 | 35.37 | 29.08 | 82.24% | 32,895 | 4 |
| Bahawalpur | Chak No 037/b C | 4 | 66.59 | 55.97 | 84.05% | 33,620 | 4 |
| Ahmadpur East | Sukhail | 4 | 67.99 | 58.87 | 86.58% | 34,631 | 4 |
| Khairpur Tamewali | Bheli | 4 | 72.88 | 63.61 | 87.27% | 34,908 | 4 |
| Hasilpur | Hasil Pur Old | 4 | 64.43 | 56.75 | 88.07% | 35,229 | 4 |
| Khairpur Tamewali | Syed Imam Shah | 5 | 81.28 | 57.87 | 71.20% | 35,602 | 4 |
| Yazman | Chak No 106/d B | 4 | 82.04 | 37.32 | 45.49% | 18,195 | 3 |
| Hasilpur | Chak No 59 Fateh | 5 | 116.03 | 42.37 | 36.52% | 18,260 | 3 |
| Ahmadpur East | Mahand | 2 | 34.41 | 31.53 | 91.62% | 18,324 | 3 |
| Ahmadpur East | Bin Wala | 2 | 70.18 | 64.83 | 92.37% | 18,474 | 3 |
| Bahawalpur City | Jamrani Kohna | 2 | 39.47 | 36.61 | 92.75% | 18,551 | 3 |
| Yazman | Chak No 017/d N B | 2 | 8.75 | 8.14 | 93.01% | 18,602 | 3 |
| Ahmadpur East | Dhoor Kot | 2 | 45.05 | 41.90 | 93.01% | 18,602 | 3 |
| Ahmadpur East | Ali Kharak | 2 | 62.26 | 58.00 | 93.17% | 18,634 | 3 |
| Bahawalpur | Jamrani Kohna_1 | 2 | 45.46 | 42.47 | 93.43% | 18,685 | 3 |
| Bahawalpur | Miani | 2 | 123.73 | 116.24 | 93.95% | 18,789 | 3 |
| Ahmadpur East | Khair Pur Dhaha | 2 | 83.65 | 78.75 | 94.14% | 18,828 | 3 |
| Ahmadpur East | Mubarak Pur | 2 | 35.99 | 33.93 | 94.26% | 18,852 | 3 |
| Bahawalpur | Chak No 004/b C_1 | 2 | 44.19 | 41.76 | 94.52% | 18,903 | 3 |
| Ahmadpur East | Khuda Bux Mehar | 2 | 70.16 | 66.49 | 94.76% | 18,953 | 3 |
| Ahmadpur East | Janu Wala | 2 | 4.13 | 3.96 | 95.90% | 19,180 | 3 |
| Ahmadpur East | Kotla Musa Khan | 2 | 67.20 | 64.57 | 96.09% | 19,218 | 3 |
| Yazman | Chak No 024/bc_1 | 2 | 4.29 | 4.15 | 96.63% | 19,325 | 3 |
| Bahawalpur | Jhangi Wali Jamrani Kohna_1 | 2 | 4.14 | 4.03 | 97.49% | 19,498 | 3 |
| Khairpur Tamewali | Kotla Qain Khan | 2 | 65.04 | 63.64 | 97.84% | 19,568 | 3 |
| Yazman | Chak No 037/b C_1 | 2 | 3.56 | 3.49 | 97.87% | 19,573 | 3 |

FOOD SECURITY AGAINST DROUGHT

| Tehsil | Union Council | Drought Severity Score | Area of UC (sq.km) | Agricultural Land (sq.km) | %age of Agri to Total Land | Food Insecurity | Food Insecurity Ranking |
|-------------------|----------------------|------------------------|--------------------|---------------------------|----------------------------|-----------------|-------------------------|
| Ahmadpur East | MUD PEER WAH | 2 | 61.77 | 60.60 | 98.10% | 19,619 | 3 |
| Ahmadpur East | TIBBI IZZAT | 2 | 54.10 | 53.39 | 98.69% | 19,737 | 3 |
| Bahawalpur | JAMRANI | 2 | 6.27 | 6.21 | 99.10% | 19,821 | 3 |
| Khairpur Tamewali | JHADANI BAD SH.WHAN) | 2 | 3.13 | 3.12 | 99.65% | 19,929 | 3 |
| Hasilpur | JAM PUR | 2 | 4.50 | 4.48 | 99.67% | 19,934 | 3 |
| Hasilpur | CHAK NO 188/MURAD | 4 | 88.84 | 49.30 | 55.50% | 22,200 | 3 |
| Yazman | CHAK NO 067/D B | 3 | 81.11 | 60.15 | 74.16% | 22,247 | 3 |
| Bahawalpur | CHAK NO 024/BC | 4 | 153.06 | 88.62 | 57.90% | 23,161 | 3 |
| Ahmadpur East | MEHRAB WALA | 4 | 27.93 | 16.73 | 59.92% | 23,970 | 3 |
| Yazman | DERAWER | 5 | 7.74 | 3.76 | 48.59% | 24,293 | 3 |
| Yazman | CHAK NO 117/D B | 4 | 82.46 | 53.23 | 64.55% | 25,821 | 3 |
| Hasilpur | CHAK NO 163 MURAD | 2 | 105.42 | 51.21 | 48.58% | 9,716 | 2 |
| Hasilpur | CHAK NO 079/FATEH | 4 | 124.74 | 33.28 | 26.68% | 10,670 | 2 |
| Bahawalpur City | RAMAN | 2 | 40.23 | 24.25 | 60.28% | 12,056 | 2 |
| Hasilpur | CHAK NO 163MURAD | 2 | 7.03 | 4.38 | 62.31% | 12,462 | 2 |
| Ahmadpur East | AHMEDPUR EAST | 2 | 6.17 | 3.95 | 64.09% | 12,818 | 2 |
| Yazman | CHAK NO 044/D B | 2 | 178.82 | 122.22 | 68.35% | 13,670 | 2 |
| Bahawalpur | CHAK NO 012/B C_1 | 2 | 46.45 | 31.76 | 68.38% | 13,676 | 2 |
| Yazman | CHAK NO 167/D B | 4 | 15.58 | 5.63 | 36.12% | 14,449 | 2 |
| Bahawalpur | KHANU WALI_1 | 2 | 45.27 | 33.79 | 74.65% | 14,930 | 2 |
| Yazman | CHAK NO 004/B C | 2 | 12.26 | 9.41 | 76.78% | 15,356 | 2 |
| Bahawalpur City | CHAK NO 012/B C | 4 | 12.01 | 4.64 | 38.59% | 15,436 | 2 |
| Ahmadpur East | BINWALA | 2 | 8.47 | 6.63 | 78.30% | 15,661 | 2 |
| Khairpur Tamewali | KOTLA QAIM KHAN | 2 | 3.42 | 2.75 | 80.21% | 16,043 | 2 |
| Yazman | CHAK NO 012/BC_2 | 2 | 21.85 | 18.19 | 83.22% | 16,643 | 2 |
| Yazman | CHAK NO 088/D B | 3 | 41.33 | 23.28 | 56.34% | 16,901 | 2 |
| Bahawalpur | SANJAR | 2 | 43.13 | 36.51 | 84.65% | 16,929 | 2 |
| Bahawalpur City | KHANU WALI | 2 | 145.81 | 124.16 | 85.16% | 17,031 | 2 |
| Yazman | CHAK NO 058/FORD_1 | 2 | 14.13 | 12.12 | 85.76% | 17,152 | 2 |
| Hasilpur | PALLAH | 2 | 123.82 | 106.36 | 85.89% | 17,179 | 2 |
| Yazman | CHAK NO 047/D N B | 2 | 62.03 | 53.87 | 86.85% | 17,370 | 2 |
| Ahmadpur East | BAKHTIARI | 2 | 53.58 | 46.87 | 87.49% | 17,497 | 2 |
| Bahawalpur | JALAL ABAD | 2 | 60.93 | 53.53 | 87.85% | 17,570 | 2 |
| Khairpur Tamewali | JHADANI | 2 | 118.31 | 104.25 | 88.12% | 17,624 | 2 |
| Hasilpur | JAMAL PUR | 2 | 95.43 | 84.63 | 88.69% | 17,738 | 2 |
| Yazman | CHAK NO 089/FATEH | 2 | 19.03 | 16.89 | 88.73% | 17,746 | 2 |
| Ahmadpur East | NUNARI | 2 | 68.38 | 60.70 | 88.78% | 17,756 | 2 |
| Yazman | CHAK NO 057/D B | 2 | 82.91 | 73.70 | 88.89% | 17,778 | 2 |
| Ahmadpur East | H GILANI | 2 | 41.58 | 36.98 | 88.94% | 17,788 | 2 |
| Bahawalpur | KHANGA SHARIF | 2 | 20.33 | 18.24 | 89.73% | 17,946 | 2 |
| Yazman | CHANAN PIR | 5 | 6.04 | 0.00 | 0.00% | 0 | 1 |
| Yazman | CHOLISTAN | 5 | 17259.63 | 775.61 | 4.49% | 2,247 | 1 |
| Bahawalpur | RAMAN_1 | 2 | 12.05 | 2.14 | 17.78% | 3,557 | 1 |
| Yazman | YAZMAN_1 | 2 | 897.65 | 310.43 | 34.58% | 6,916 | 1 |
| Hasilpur | CHAK NO 192/MURAD | 4 | 88.12 | 17.90 | 20.31% | 8,125 | 1 |

Drought Hazard Severity Score

| | |
|------------|---|
| No Drought | 1 |
| Mild | 2 |
| Moderate | 3 |
| Severe | 4 |
| Extreme | 5 |

Food Insecurity Index

| | |
|--------------------------|---|
| Food Secure | 1 |
| Mild Food Secure | 2 |
| Moderately Food Insecure | 3 |
| Highly Food Insecure | 4 |
| Severely Food Insecure | 5 |

FOOD SECURITY AGAINST FLOOD

| Tehsil | Union Council | Flood Hazard Score (Riverine + Flash) | Area of UC (sq.km) | Agricultural Land (sq.km) | Agricultural Area Exposed | Percentage Agricultural Land Exposed | Food Insecurity | Food Insecurity Ranking |
|-------------------|-----------------------------|---------------------------------------|--------------------|---------------------------|---------------------------|--------------------------------------|-----------------|-------------------------|
| Ahmadpur East | Khair Pur Dhaha | 4 | 83.65 | 78.75 | 55.47 | 70.44% | 28,176 | 4 |
| Ahmadpur East | Dhoor Kot | 3 | 45.05 | 41.90 | 41.35 | 98.68% | 29,604 | 4 |
| Ahmadpur East | H Bukhari | 3 | 38.96 | 37.11 | 37.11 | 100.00% | 30,000 | 4 |
| Khairpur Tamewali | Kotla Qaim Khan | 3 | 3.42 | 2.75 | 2.75 | 100.00% | 30,000 | 4 |
| Bahawalpur | Jalal Abad | 3 | 60.93 | 53.53 | 33.83 | 63.21% | 18,962 | 3 |
| Bahawalpur | Chak No 004/b C_1 | 3 | 44.19 | 41.76 | 26.78 | 64.13% | 19,238 | 3 |
| Ahmadpur East | Binwala | 2 | 8.47 | 6.63 | 6.56 | 98.98% | 19,796 | 3 |
| Bahawalpur City | Jamrani Kohna | 3 | 39.47 | 36.61 | 27.19 | 74.26% | 22,277 | 3 |
| Bahawalpur | Jhangi Wali Jamrani Kohna_1 | 3 | 4.14 | 4.03 | 3.14 | 77.79% | 23,337 | 3 |
| Bahawalpur | Sanjar | 3 | 43.13 | 36.51 | 29.10 | 79.70% | 23,909 | 3 |
| Ahmadpur East | Kotla Musa Khan | 3 | 67.20 | 64.57 | 51.51 | 79.77% | 23,932 | 3 |
| Ahmadpur East | Nunari | 3 | 68.38 | 60.70 | 51.49 | 84.82% | 25,446 | 3 |
| Ahmadpur East | Bahawalpur Khalwan | 3 | 87.80 | 82.85 | 72.48 | 87.49% | 26,247 | 3 |
| Ahmadpur East | Dhoor Kor | 3 | 28.52 | 27.11 | 24.38 | 89.90% | 26,969 | 3 |
| Ahmadpur East | Khurampur | 3 | 71.29 | 68.30 | 20.54 | 30.07% | 9,020 | 2 |
| Hasilpur | Jamal Pur | 3 | 95.43 | 84.63 | 25.69 | 30.35% | 9,105 | 2 |
| Khairpur Tamewali | Israni | 3 | 157.86 | 117.21 | 35.58 | 30.36% | 9,107 | 2 |
| Hasilpur | Pallah | 3 | 123.82 | 106.36 | 32.98 | 31.01% | 9,302 | 2 |
| Khairpur Tamewali | Guddan | 3 | 175.07 | 107.46 | 37.53 | 34.92% | 10,476 | 2 |
| Khairpur Tamewali | Jhadani | 4 | 118.31 | 104.25 | 29.78 | 28.56% | 11,425 | 2 |
| Ahmadpur East | H Gilani | 3 | 41.58 | 36.98 | 14.38 | 38.88% | 11,664 | 2 |
| Ahmadpur East | Bin Wala | 3 | 70.18 | 64.83 | 30.76 | 47.45% | 14,235 | 2 |
| Ahmadpur East | Chanab Rasool Pur | 2 | 49.50 | 36.67 | 27.69 | 75.51% | 15,102 | 2 |
| Bahawalpur City | Chak No 012/b C | 2 | 12.01 | 4.64 | 3.80 | 81.98% | 16,395 | 2 |
| Bahawalpur | Chak No 037/b C | 3 | 66.59 | 55.97 | 30.69 | 54.84% | 16,453 | 2 |
| Ahmadpur East | Hatheji | 3 | 46.63 | 45.40 | 25.26 | 55.64% | 16,692 | 2 |
| Bahawalpur City | Khanu Wali | 3 | 145.81 | 124.16 | 70.18 | 56.52% | 16,957 | 2 |
| Ahmadpur East | Janu Wala | 2 | 4.13 | 3.96 | 0.03 | 0.81% | 161 | 1 |
| Bahawalpur | Jamrani Kohna_1 | 2 | 45.46 | 42.47 | 0.52 | 1.22% | 245 | 1 |
| Bahawalpur City | Raman | 2 | 40.23 | 24.25 | 0.49 | 2.03% | 406 | 1 |
| Khairpur Tamewali | Jhadani Bad Sh.whan) | 2 | 3.13 | 3.12 | 0.17 | 5.54% | 1,108 | 1 |
| Ahmadpur East | Khuda Bux Mehar | 2 | 70.16 | 66.49 | 8.92 | 13.42% | 2,684 | 1 |
| Ahmadpur East | Kot Khalifa | 3 | 42.42 | 41.94 | 4.07 | 9.71% | 2,913 | 1 |
| Khairpur Tamewali | Kotla Qain Khan | 3 | 65.04 | 63.64 | 6.56 | 10.31% | 3,094 | 1 |
| Bahawalpur City | Jhangi Wali Jamrani Kohna | 3 | 8.54 | 7.90 | 1.23 | 15.52% | 4,655 | 1 |
| Ahmadpur East | Ali Kharak | 3 | 62.26 | 58.00 | 9.06 | 15.62% | 4,687 | 1 |
| Bahawalpur | Bahawalpur_1 | 3 | 203.88 | 119.94 | 20.59 | 17.16% | 5,149 | 1 |
| Ahmadpur East | Bakhtiari | 2 | 53.58 | 46.87 | 12.12 | 25.85% | 5,170 | 1 |
| Khairpur Tamewali | Bheli | 3 | 72.88 | 63.61 | 13.75 | 21.62% | 6,485 | 1 |
| Ahmadpur East | Mandhal | 2 | 18.19 | 18.11 | 6.86 | 37.91% | 7,581 | 1 |
| Khairpur Tamewali | Inayati | 3 | 48.00 | 43.40 | 11.19 | 25.78% | 7,735 | 1 |
| Bahawalpur | Khanu Wali_1 | 2 | 45.27 | 33.79 | 14.11 | 41.75% | 8,350 | 1 |
| Bahawalpur | Miani | 3 | 123.73 | 116.24 | 33.88 | 29.15% | 8,744 | 1 |



| Flood Hazard Severity Score | |
|-----------------------------|---|
| 0.3 | 1 |
| 3.1 - 6 | 2 |
| 6.1 - 9 | 3 |
| 9.1 - 12t | 4 |
| > 12 | 5 |

| Food Insecurity Index | |
|-------------------------|---|
| Food Secure | 1 |
| Mild Food Secure | 2 |
| Moderatly Food Insecure | 3 |
| Highly Food Insecure | 4 |
| Severly Food Insecure | 5 |

Cumulative Severity of both Riverine and Hill torrents/ Flashfloods has been taken in account for the assessment.

$$\text{Food Insecurity} = (\text{Hazard Severity}) * (\text{Percentage of Agriculture to Total Land}) * (\text{Percentage of Agriculture Dependent Population to Total Population})$$



E

RISK ASSESSMENT



**Population
Density**



**Building
Density**



**Health
Facilities**



**Communication
Towers**



**Major
Industries**



Roads



**Education
Facilities**



Railway



**Critical
Infrastructure**

The given study has employed Integrated Risk Assessment Model, as shown in the figure below, for the cumulative risk assessment of study district. The Model takes into account both quantitative and qualitative risk assessment approaches. The methodology is based on multi criteria evaluation as well as analytical hierarchy process. For this purpose, set of indicators for each risk factors have been carefully taken based on the availability as well as the specific context of the study district. In the given methodology four separate dimensions of risk are considered as "factor Components" i.e. hazard, exposure, vulnerability and capacity. To analyze the value of factor components, a combination of quantitative, qualitative and contextual indicators have be assigned to each factor component. Each factor consists of a sets of indicators which cover several aspects of risk. The Risk Index considered a total of 52 indicators to cover physical, economic, demographic, social, environmental and economic dimensions of risk. Specific weights have been assigned to each indicator in order to acutely calculate its impact on risk. The maximum sum of all the elements of weights and indicators can have minimize value of 100, whereas the minimum sum is 0. The risk formula used in the Study is given below:

$$\text{Risk} = (\text{Hazard} \times \text{Vulnerability} \times \text{Exposure} / \text{Capacity})$$

Five classes have been devised to categorize risk between "No to Very Low" Risk to "Very High Risk".

| Risk Score | Risk State |
|------------|-------------------|
| >4.1 | Extremely High |
| 3.1-4.0 | High to very High |
| 2.1-3.0 | Moderate to High |
| 1.1-2.0 | Low to moderate |
| 0-1.0 | No to very Low |

| Earthquake Hazard Severity Score | | |
|----------------------------------|---|-----------|
| 3.0 - 3.9 Richter Scale | 1 | Very Low |
| 4.0 - 4.9 Richter Scale | 2 | Low |
| 5.0 - 5.9 Richter Scale | 3 | Moderate |
| 6.0 - 6.9 Richter Scale | 4 | High |
| 7 more Richter Scale | 5 | Very High |
| 0 represents No Hazard | | |

| Flood Hazard Severity Score | | |
|-------------------------------|---|-----------|
| 0.3 | 1 | Very Low |
| 3.1 - 6 | 2 | Low |
| 6.1 - 9 | 3 | Moderate |
| 9.1 - 12t | 4 | High |
| > 12 | 5 | Very High |
| 0 represents No Hazard | | |

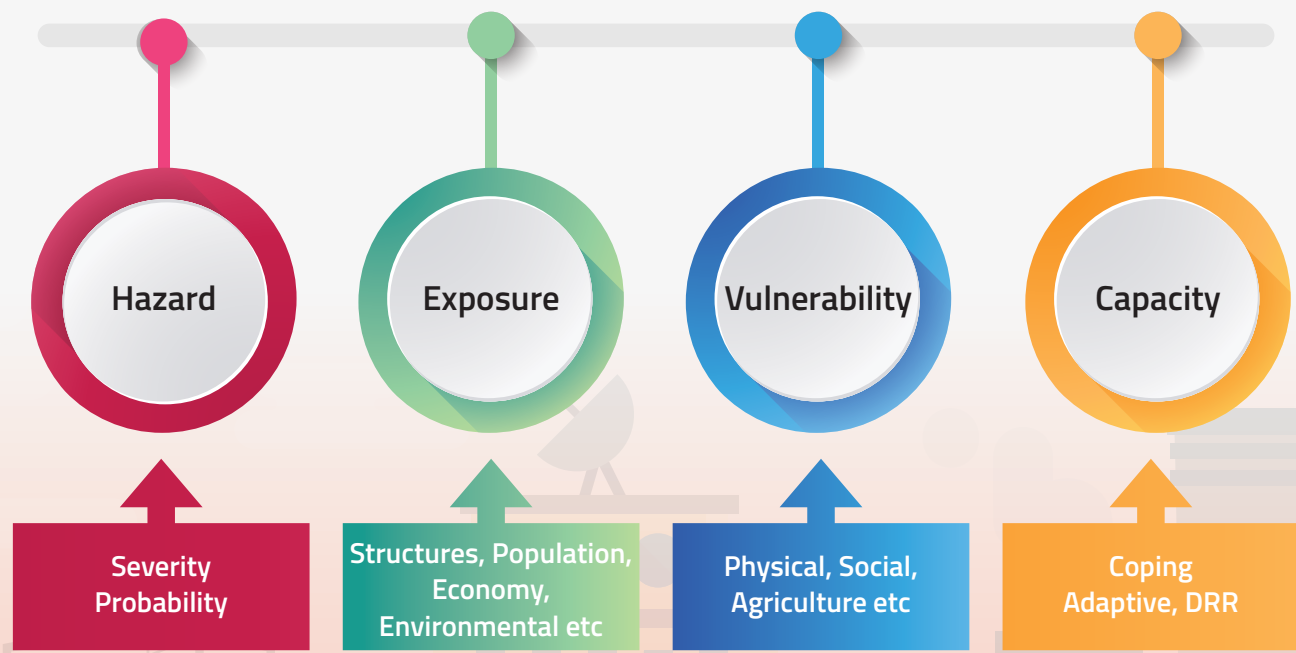
| Drought Hazard Severity Score | | |
|-------------------------------|---|-----------|
| No Drought | 1 | Very Low |
| Mild | 2 | Low |
| Moderate | 3 | Medium |
| Severe | 4 | High |
| Extreme | 5 | Very High |
| 0 represents No Hazard | | |

| Exposure Scoring Scale | |
|------------------------|------------------|
| 1 | No to Negligible |
| 2 | Low |
| 3 | Medium |
| 4 | High |
| 5 | Extremely High |

| Vulnerabilty Scoring Scale | |
|----------------------------|------------------|
| 1 | No to Negligible |
| 2 | Low |
| 3 | Medium |
| 4 | High |
| 5 | Extremely High |

| Capacity Scoring Scale | |
|------------------------|------------------|
| 1 | No to Negligible |
| 2 | Low |
| 3 | Medium |
| 4 | High |
| 5 | Extremely High |

Disaster Risk Impact Factor



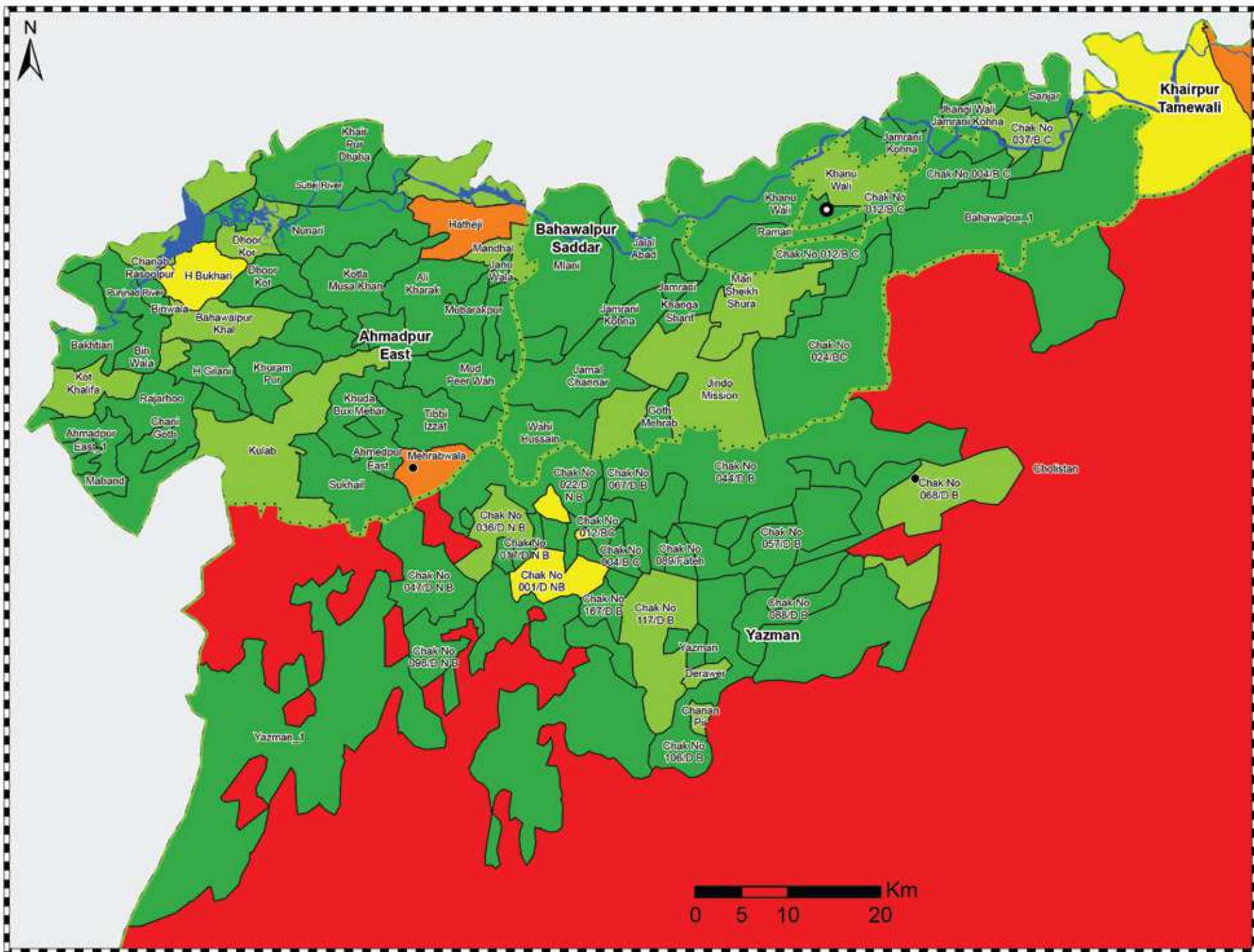
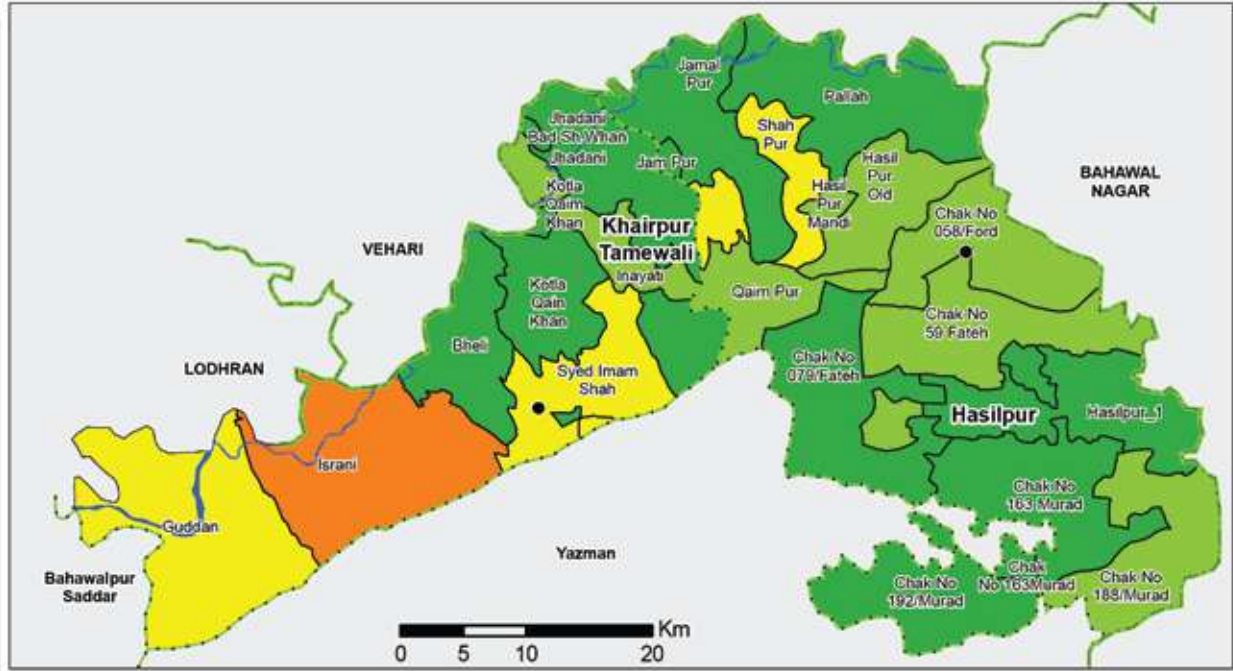
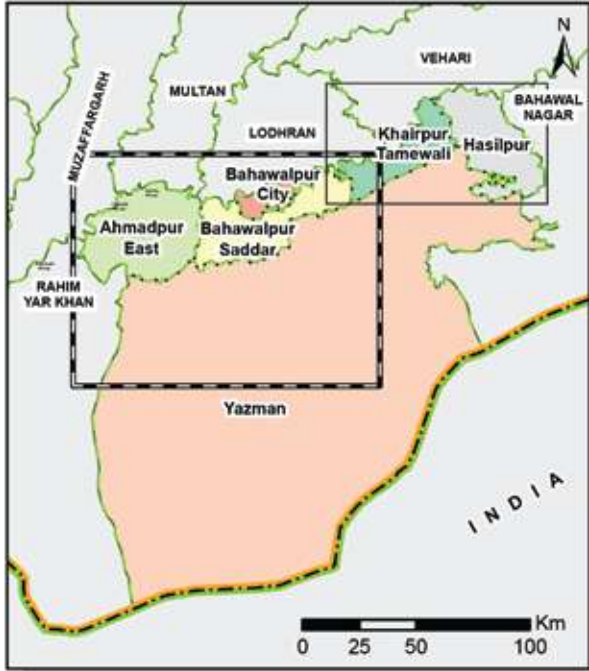
| UNION COUNCILS | HAZARD | | | EXPOSURE | | VULNERABILITY | | | COPING CAPACITY | RISK | | | OVERALL |
|-----------------------------|------------------|---------|-----------------------|----------|----------|---------------|---------|------------|-----------------|-------|---------|------------|---------|
| | FLOOD YRP 100 | DROUGHT | EARTHQUAKE YRP 475 | FLOOD | EXPOSURE | FLOOD | DROUGHT | EARTHQUAKE | | FLOOD | DROUGHT | EARTHQUAKE | |
| AHMADPUR EAST_1 | 0.00 | 1.00 | 3.00 | 0.38 | 0.50 | 2.25 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| AHMEDPUR EAST | 0.00 | 1.00 | 3.00 | 1.00 | 0.50 | 1.33 | 1.33 | 1.50 | 3 | 1 | 1 | 2 | 2 |
| ALI KHARAK | 1.00 | 1.00 | 3.00 | 1.00 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 2 | 2 |
| BAHAWALPUR KHALWAN | 5.00 | 3.00 | 3.00 | 1.00 | 1.00 | 1.50 | 1.33 | 1.00 | 3 | 5 | 2 | 1 | 3 |
| BAHAWALPUR_1 | 2.00 | 1.00 | 3.00 | 1.38 | 1.00 | 1.50 | 1.67 | 1.50 | 3 | 4 | 1 | 3 | 3 |
| BAKHTIARI | 2.00 | 1.00 | 3.00 | 0.38 | 0.50 | 3.00 | 2.33 | 1.50 | 3 | 2 | 1 | 1 | 2 |
| BHELI | 2.00 | 3.00 | 3.00 | 0.75 | 1.00 | 1.50 | 1.00 | 1.00 | 3 | 2 | 1 | 1 | 2 |
| BIN WALA | 2.00 | 1.00 | 3.00 | 0.63 | 1.00 | 2.00 | 1.33 | 1.00 | 3 | 4 | 1 | 1 | 2 |
| BINWALA | 1.00 | 1.00 | 3.00 | 0.38 | 0.50 | 2.50 | 1.67 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 001/D N B | 0.00 | 4.00 | 3.00 | 0.88 | 1.00 | 1.67 | 1.67 | 1.00 | 3 | 1 | 3 | 1 | 2 |
| CHAK NO 004/B C | 0.00 | 1.00 | 3.00 | 0.63 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 004/B C_1 | 2.00 | 1.00 | 3.00 | 0.75 | 1.00 | 1.25 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 012/B C | 1.00 | 3.00 | 3.00 | 1.00 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 2 | 2 |
| CHAK NO 012/B C_1 | 0.00 | 1.00 | 3.00 | 0.75 | 0.50 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 012/BC_2 | 0.00 | 1.00 | 3.00 | 0.50 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 017/D N B | 0.00 | 1.00 | 3.00 | 0.50 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 022/D N B | 0.00 | 3.00 | 3.00 | 0.88 | 0.50 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 024/BC | 0.00 | 3.00 | 3.00 | 1.00 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 2 | 2 |
| CHAK NO 024/BC_1 | 0.00 | 1.00 | 3.00 | 0.50 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 036/D N B | 0.00 | 3.00 | 3.00 | 0.75 | 0.50 | 2.67 | 2.67 | 2.50 | 3 | 1 | 2 | 2 | 2 |
| CHAK NO 037/B C | 3.00 | 3.00 | 3.00 | 0.75 | 0.50 | 2.75 | 3.00 | 2.50 | 3 | 5 | 2 | 2 | 3 |
| CHAK NO 037/B C_1 | 0.00 | 1.00 | 3.00 | 0.38 | 0.50 | 2.33 | 2.33 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 044/D B | 0.00 | 1.00 | 3.00 | 1.13 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 2 | 2 |
| CHAK NO 047/D N B | 0.00 | 1.00 | 3.00 | 0.75 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 2 | 2 |
| CHAK NO 057/D B | 0.00 | 1.00 | 3.00 | 0.88 | 0.50 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 058/FORD | 0.00 | 4.00 | 3.00 | 1.25 | 1.00 | 1.33 | 1.33 | 1.00 | 3 | 1 | 2 | 2 | 2 |
| CHAK NO 058/FORD_1 | 0.00 | 1.00 | 3.00 | 0.63 | 0.50 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 067/D B | 0.00 | 2.00 | 3.00 | 0.88 | 0.50 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 068/D B | 0.00 | 3.00 | 3.00 | 1.25 | 1.00 | 1.33 | 1.33 | 1.00 | 3 | 1 | 2 | 2 | 2 |
| CHAK NO 079/FATEH | 0.00 | 3.00 | 3.00 | 0.63 | 0.50 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 088/D B | 0.00 | 2.00 | 3.00 | 0.50 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 089/FATEH | 0.00 | 1.00 | 3.00 | 0.63 | 0.50 | 2.00 | 2.00 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 098/D N B | 0.00 | 3.00 | 3.00 | 0.75 | 0.50 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 106/D B | 0.00 | 3.00 | 3.00 | 0.75 | 0.50 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 117/D B | 0.00 | 3.00 | 3.00 | 0.75 | 1.00 | 1.33 | 1.33 | 1.00 | 3 | 1 | 2 | 1 | 2 |
| CHAK NO 163 MURAD | 0.00 | 1.00 | 3.00 | 0.63 | 0.50 | 2.67 | 2.67 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 163MURAD | 0.00 | 1.00 | 3.00 | 0.50 | 0.50 | 2.33 | 2.33 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 167/D B | 0.00 | 3.00 | 3.00 | 0.50 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 188/MURAD | 0.00 | 3.00 | 3.00 | 0.63 | 0.50 | 2.67 | 2.67 | 1.50 | 3 | 1 | 2 | 1 | 2 |
| CHAK NO 192/MURAD | 0.00 | 3.00 | 3.00 | 0.63 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| CHAK NO 59 FATEH | 0.00 | 4.00 | 3.00 | 0.63 | 0.50 | 1.67 | 1.67 | 1.50 | 3 | 1 | 2 | 1 | 2 |
| CHANAB RASOOLPUR | 3.00 | 4.00 | 3.00 | 0.38 | 0.50 | 2.75 | 2.00 | 1.50 | 3 | 3 | 2 | 1 | 2 |
| CHANAN PIR | 0.00 | 4.00 | 3.00 | 0.25 | 0.50 | 2.00 | 2.00 | 1.50 | 3 | 1 | 2 | 1 | 2 |
| CHANI GOTH | 0.00 | 3.00 | 3.00 | 1.13 | 1.00 | 2.00 | 1.00 | 1.00 | 3 | 1 | 1 | 2 | 2 |
| CHOLISTAN | 0.00 | 4.00 | 3.00 | 2.63 | 2.00 | 1.67 | 1.67 | 1.00 | 3 | 1 | 5 | 3 | 3 |
| DERAWER | 0.00 | 4.00 | 3.00 | 0.25 | 0.50 | 2.00 | 2.00 | 1.50 | 3 | 1 | 2 | 1 | 2 |
| DHOOR KOR | 2.00 | 4.00 | 3.00 | 0.50 | 0.50 | 3.00 | 2.67 | 1.50 | 3 | 3 | 2 | 1 | 2 |
| DHOOR KOT | 3.00 | 1.00 | 3.00 | 0.88 | 0.50 | 2.50 | 2.33 | 1.50 | 3 | 5 | 1 | 2 | 3 |
| GOTH MEHRAB | 0.00 | 3.00 | 3.00 | 0.50 | 0.50 | 1.67 | 1.67 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| GUDDAN | 3.00 | 4.00 | 3.00 | 0.75 | 1.00 | 1.50 | 1.67 | 1.00 | 3 | 5 | 3 | 1 | 3 |
| H BUKHARI | 3.00 | 3.00 | 3.00 | 0.88 | 1.00 | 3.00 | 2.33 | 1.00 | 3 | 5 | 3 | 1 | 3 |
| H GILANI | 2.00 | 1.00 | 3.00 | 1.13 | 1.00 | 3.00 | 2.67 | 1.50 | 3 | 5 | 1 | 2 | 3 |
| HASIL PUR MANDI | 0.00 | 4.00 | 3.00 | 0.63 | 0.50 | 2.67 | 2.67 | 1.50 | 3 | 1 | 2 | 1 | 2 |
| HASIL PUR OLD | 0.00 | 3.00 | 3.00 | 0.88 | 1.00 | 1.67 | 1.67 | 1.50 | 3 | 1 | 2 | 2 | 2 |
| HASILPUR_1 | 0.00 | 1.00 | 3.00 | 0.63 | 0.00 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| HATHEJI | 2.00 | 4.00 | 3.00 | 1.00 | 1.00 | 2.25 | 2.67 | 1.50 | 3 | 3 | 4 | 2 | 3 |
| INAYATI | 1.00 | 3.00 | 3.00 | 0.63 | 0.50 | 2.00 | 2.33 | 1.50 | 3 | 2 | 2 | 1 | 2 |
| ISRANI | 3.00 | 4.00 | 3.00 | 0.88 | 1.00 | 2.00 | 2.33 | 1.50 | 3 | 5 | 4 | 2 | 4 |
| JALAL ABAD | 3.00 | 1.00 | 3.00 | 0.75 | 1.00 | 1.25 | 1.00 | 1.00 | 3 | 3 | 1 | 1 | 2 |
| JAM PUR | 0.00 | 1.00 | 3.00 | 0.38 | 0.50 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| JAMAL CHANNAR | 0.00 | 3.00 | 3.00 | 1.00 | 0.50 | 2.00 | 2.00 | 1.50 | 3 | 1 | 1 | 2 | 2 |
| JAMAL PUR | 2.00 | 1.00 | 3.00 | 0.63 | 0.50 | 1.50 | 1.67 | 1.50 | 3 | 3 | 1 | 1 | 2 |
| JAMRANI | 0.00 | 1.00 | 3.00 | 0.50 | 0.50 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| JAMRANI KOHNA | 2.00 | 1.00 | 3.00 | 0.75 | 0.50 | 2.00 | 2.00 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| JAMRANI KOHNA_1 | 1.00 | 1.00 | 3.00 | | | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| JANU WALA | 0.00 | 1.00 | 3.00 | | | 1.33 | 1.33 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| JHADANI | 3.00 | 1.00 | 3.00 | | | 2.50 | 3.00 | 2.50 | 3 | 1 | 1 | 1 | 1 |
| JHADANI BAD SH.WHAN) | 1.00 | 1.00 | 3.00 | | | 1.67 | 1.67 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| JHANGI WALI JAMRANI KOHNA | 1.00 | 2.00 | 3.00 | | | 1.25 | 1.33 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| JHANGI WALI JAMRANI KOHNA_1 | 1.00 | 1.00 | 3.00 | | | 2.33 | 2.33 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| JINDO MISSION | 0.00 | 3.00 | 3.00 | 1.13 | 1.00 | 1.67 | 1.67 | 1.50 | 3 | 1 | 2 | 2 | 2 |
| KHAIR PUR DHAHA | 3.00 | 1.00 | 3.00 | | | 1.50 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| KHANGA SHARIF | 0.00 | 1.00 | 3.00 | 1.13 | 1.00 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 2 | 2 |
| KHANU WALI | 4.00 | 1.00 | 3.00 | 1.50 | 1.50 | 1.50 | 1.67 | 1.50 | 3 | 5 | 1 | 3 | 3 |
| KHANU WALI_1 | 1.00 | 1.00 | 3.00 | 1.13 | 2.00 | 1.50 | 1.67 | 1.50 | 3 | 2 | 2 | 2 | 2 |
| KHUDA BUX MEHAR | 1.00 | 1.00 | 3.00 | | | 1.67 | 1.67 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| KHURAM PUR | 2.00 | 3.00 | 3.00 | | | 1.50 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| KOT KHALIFA | 1.00 | 2.00 | 3.00 | 0.88 | 1.00 | 3.00 | 2.33 | 1.50 | 3 | 2 | 2 | 2 | 2 |
| KOTLA MUSA KHAN | 3.00 | 1.00 | 3.00 | 1.25 | 1.00 | 1.33 | 1.33 | 1.00 | 3 | 5 | 1 | 2 | 3 |

Risk = (Hazard x Exposure x Vulnerability/Capacity)

| UNION COUNCILS | HAZARD | | | EXPOSURE | | VULNERABILITY | | | COPING CAPACITY | RISK | | | OVERALL |
|--------------------|------------------|---------|-----------------------|----------|----------|---------------|---------|------------|-----------------|-------|---------|------------|---------|
| | FLOOD YRP 100 | DROUGHT | EARTHQUAKE YRP 475 | FLOOD | EXPOSURE | FLOOD | DROUGHT | EARTHQUAKE | | FLOOD | DROUGHT | EARTHQUAKE | |
| KOTLA QAIM KHAN | 1.00 | 1.00 | 3.00 | | | 3.50 | 4.00 | 5.00 | 3 | 1 | 1 | 1 | 1 |
| KOTLA QAIN KHAN | 1.00 | 1.00 | 3.00 | 0.88 | 1.00 | 1.25 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| KULAB | 0.00 | 3.00 | 3.00 | 1.25 | 1.00 | 2.00 | 2.00 | 1.00 | 3 | 1 | 2 | 2 | 2 |
| MAHAND | 0.00 | 1.00 | 3.00 | 1.00 | 1.00 | 2.50 | 1.67 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| MANDHAL | 1.00 | 3.00 | 3.00 | 0.75 | 1.00 | 1.33 | 1.33 | 1.00 | 3 | 1 | 2 | 1 | 2 |
| MARI SHEIKH SHIJRA | 0.00 | 3.00 | 3.00 | 1.00 | 1.00 | 1.67 | 1.67 | 1.50 | 3 | 1 | 2 | 2 | 2 |
| MEHRABWALA | 0.00 | 3.00 | 3.00 | 1.38 | 1.50 | 2.33 | 2.33 | 1.50 | 3 | 1 | 4 | 3 | 3 |
| MIANI | 2.00 | 1.00 | 3.00 | 1.13 | 1.00 | 1.25 | 1.33 | 1.00 | 3 | 3 | 1 | 2 | 2 |
| MUBARAKPUR | 0.00 | 1.00 | 3.00 | 1.13 | 1.00 | 2.33 | 2.33 | 1.50 | 3 | 1 | 1 | 2 | 2 |
| MUD PEER WAH | 0.00 | 1.00 | 3.00 | | | 2.33 | 2.33 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| NUNARI | 4.00 | 1.00 | 3.00 | 1.13 | 1.00 | 2.00 | 2.00 | 1.00 | 3 | 5 | 1 | 2 | 3 |
| PALLAH | 3.00 | 1.00 | 3.00 | | | 1.25 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| QAIM PUR | 0.00 | 4.00 | 3.00 | 0.75 | 1.00 | 1.33 | 1.33 | 1.00 | 3 | 1 | 2 | 1 | 2 |
| RAJARHOO | 0.00 | 3.00 | 3.00 | | | 2.50 | 1.67 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| RAMAN | 1.00 | 1.00 | 3.00 | 1.38 | 1.00 | 2.00 | 2.00 | 1.00 | 3 | 1 | 1 | 2 | 2 |
| RAMAN_1 | 0.00 | 1.00 | 3.00 | 1.00 | 1.00 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| SANJAR | 2.00 | 1.00 | 3.00 | 0.75 | 1.00 | 1.50 | 1.33 | 1.00 | 3 | 3 | 1 | 1 | 2 |
| SHAH PUR | 0.00 | 3.00 | 3.00 | 0.75 | 1.00 | 2.33 | 2.33 | 1.50 | 3 | 1 | 3 | 2 | 2 |
| SUKHAIL | 0.00 | 3.00 | 3.00 | | | 2.00 | 2.00 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| SYED IMAM SHAH | 0.00 | 4.00 | 3.00 | 0.88 | 1.00 | 1.67 | 1.67 | 1.50 | 3 | 1 | 3 | 2 | 2 |
| TIBBI IZZAT | 0.00 | 1.00 | 3.00 | 1.25 | 1.00 | 1.33 | 1.33 | 1.00 | 3 | 1 | 1 | 2 | 2 |
| WAHI HUSSAIN | 0.00 | 3.00 | 3.00 | | | 2.33 | 2.33 | 1.50 | 3 | 1 | 1 | 1 | 1 |
| YAZMAN | 0.00 | 2.00 | 3.00 | | | 1.67 | 1.67 | 1.00 | 3 | 1 | 1 | 1 | 1 |
| YAZMAN_1 | 0.00 | 1.00 | 3.00 | | | 3.33 | 3.33 | 3.50 | 3 | 1 | 1 | 1 | 1 |

Risk = (Hazard x Exposure x Vulnerability/Capacity)

DROUGHT RISK



Legend

- District Headquarter
 - Tehsil Headquarter
 - ▬ River and Water Body
 - ▬ Union Council Boundary
 - ▬ Tehsil Boundary
 - ▬ District Boundary
 - ▬ Line of Control
 - ▬ Provincial Boundary
 - ▬ International Boundary
- Drought Risk**
- Very Low
 - Low
 - Medium
 - High
 - Very High

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan



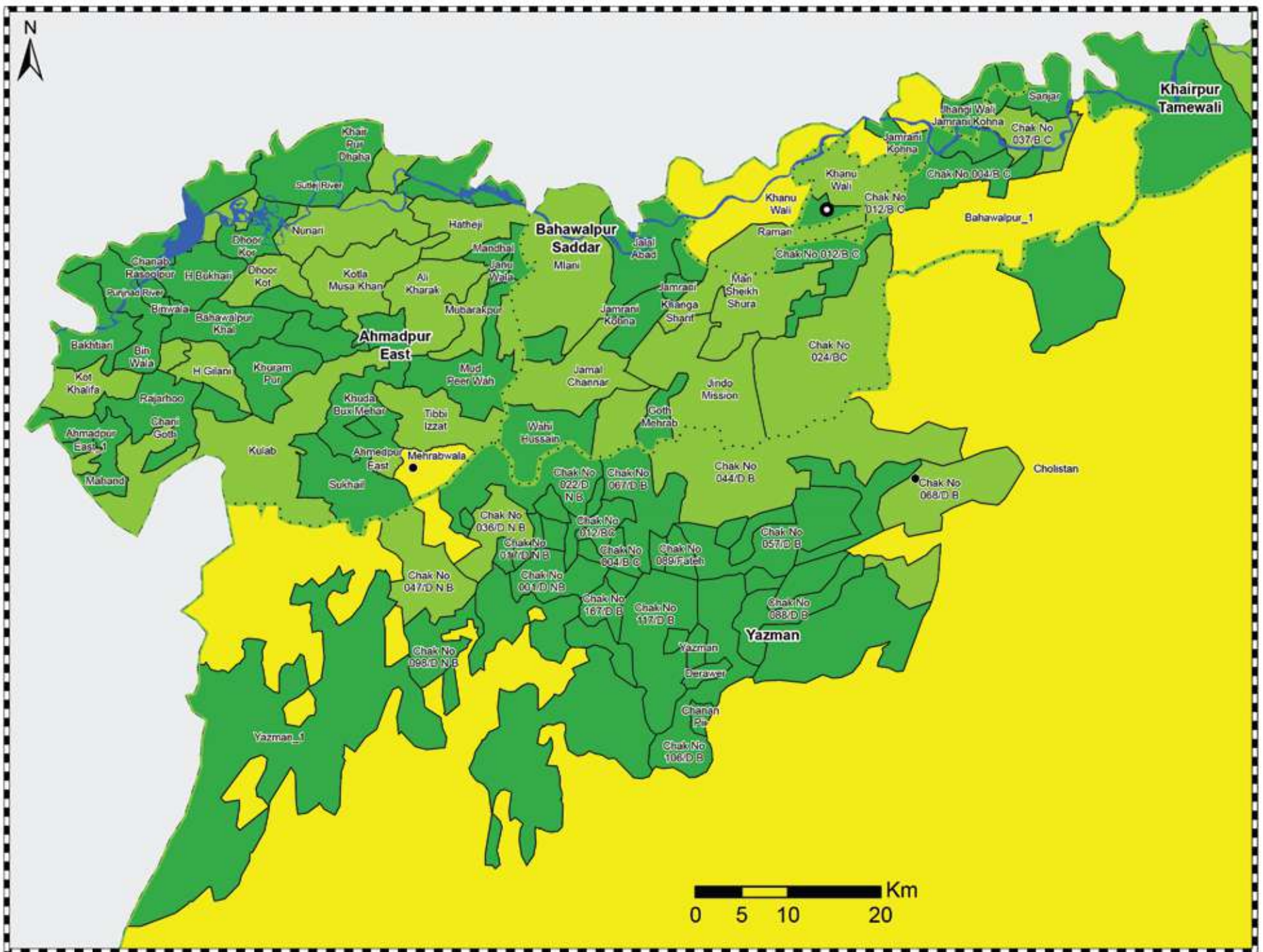
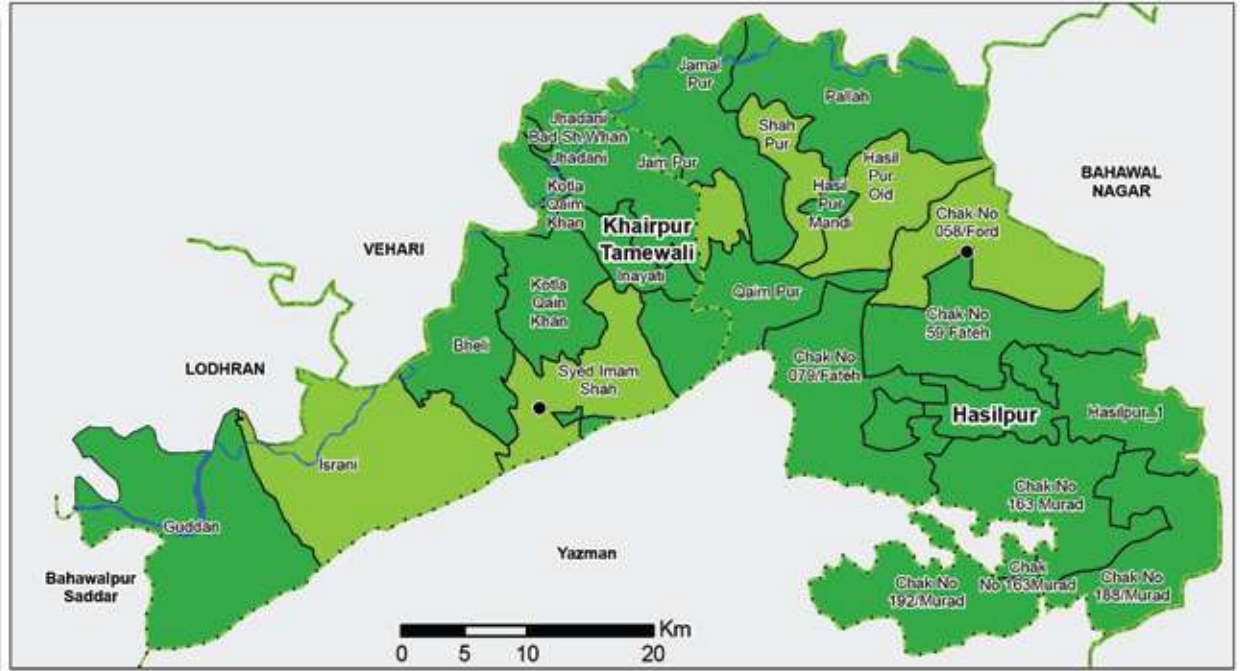
MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics,
Survey of Pakistan

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-MAY-2016-RSK-NDMA-DROUGHT
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

EARTHQUAKE RISK



Legend

- District Headquarter
- Tehsil Headquarter
- Blue line: River and Water Body
- White line: Union Council Boundary
- Green line: Tehsil Boundary
- Black line: District Boundary
- Red line: Line of Control
- Green line: Provincial Boundary
- Orange line: International Boundary

Earthquake Risk

- Very Low (Dark Green)
- Low (Light Green)
- Medium (Yellow)
- High (Orange)
- Very High (Red)

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan

Logos of the Government of Punjab, National Disaster Management Authority (NDMA), and United Nations World Food Programme (WFP).

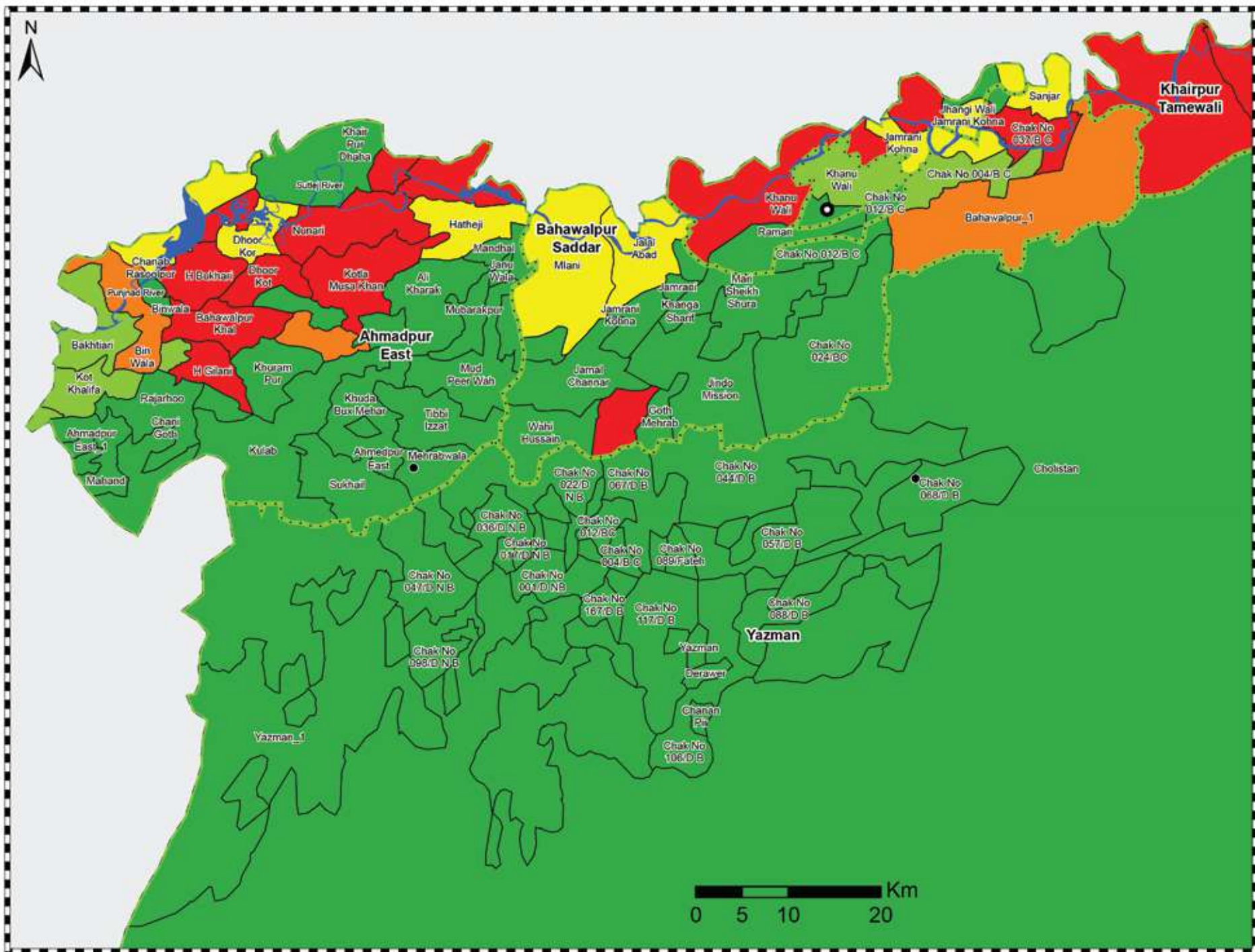
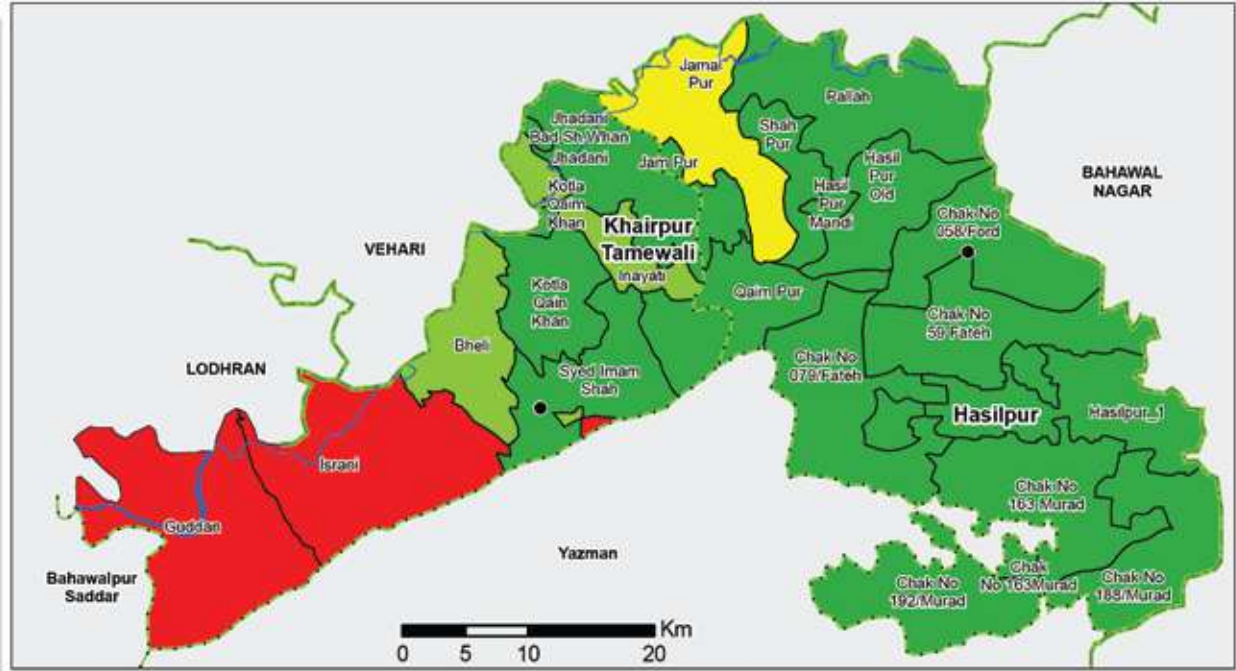
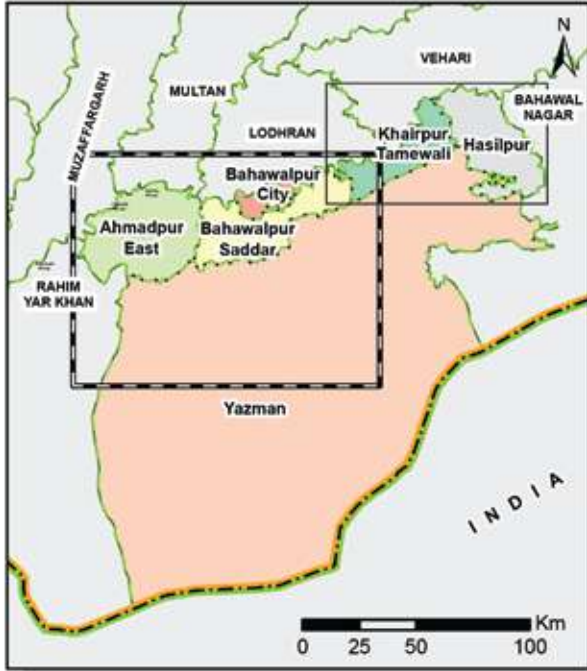
MAP INFORMATION

Data Source(s): Pakistan Bureau of Statistics, Survey of Pakistan

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-MAY-2016-RSK-NDMA-EQ
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

FLOOD RISK



Legend

- District Headquarter
- Tehsil Headquarter
- Flood Risk**
- Very Low
- Low
- Medium
- High
- Very High
- River and Water Body
- Union Council Boundary
- Tehsil Boundary
- District Boundary
- Line of Control
- Provincial Boundary
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan



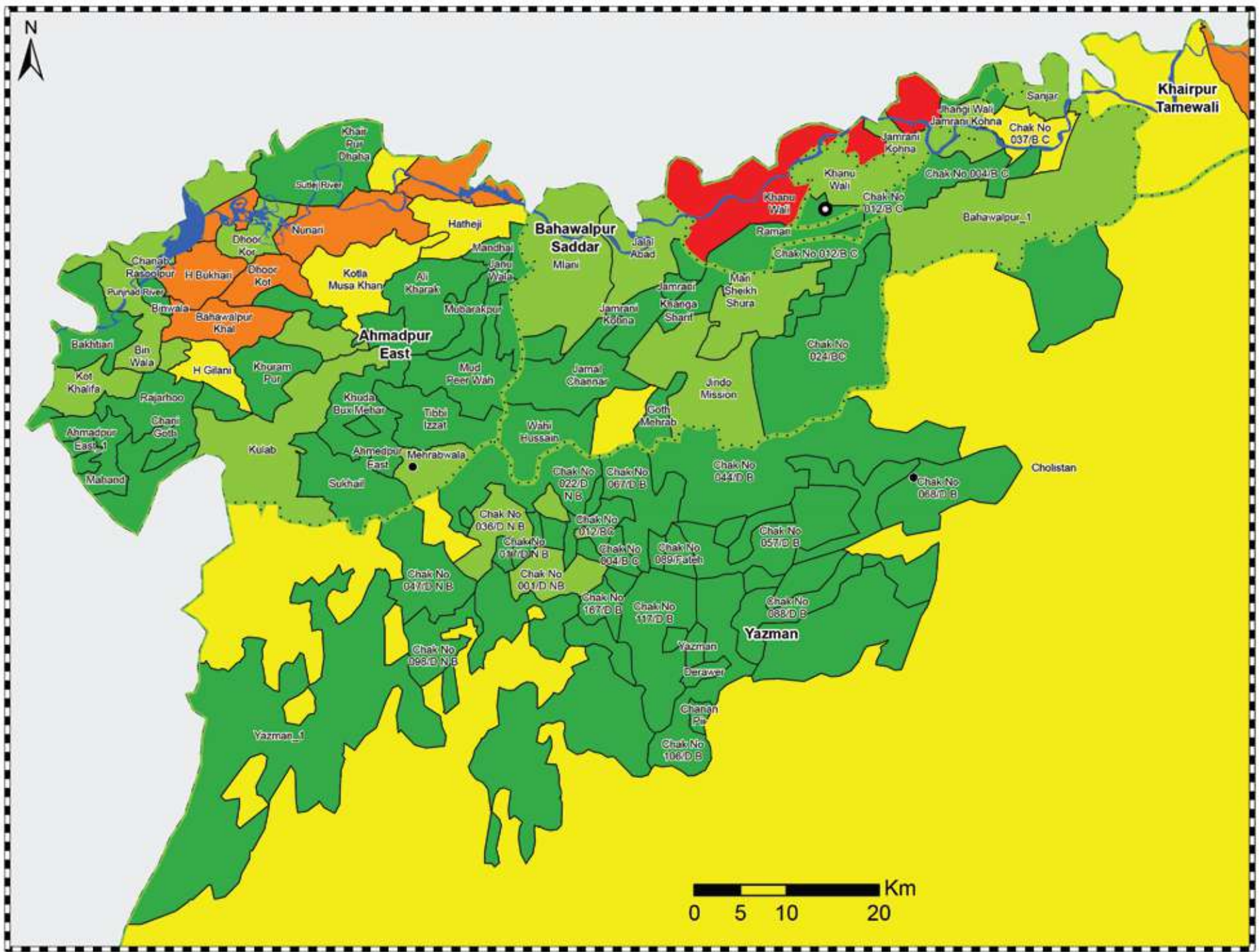
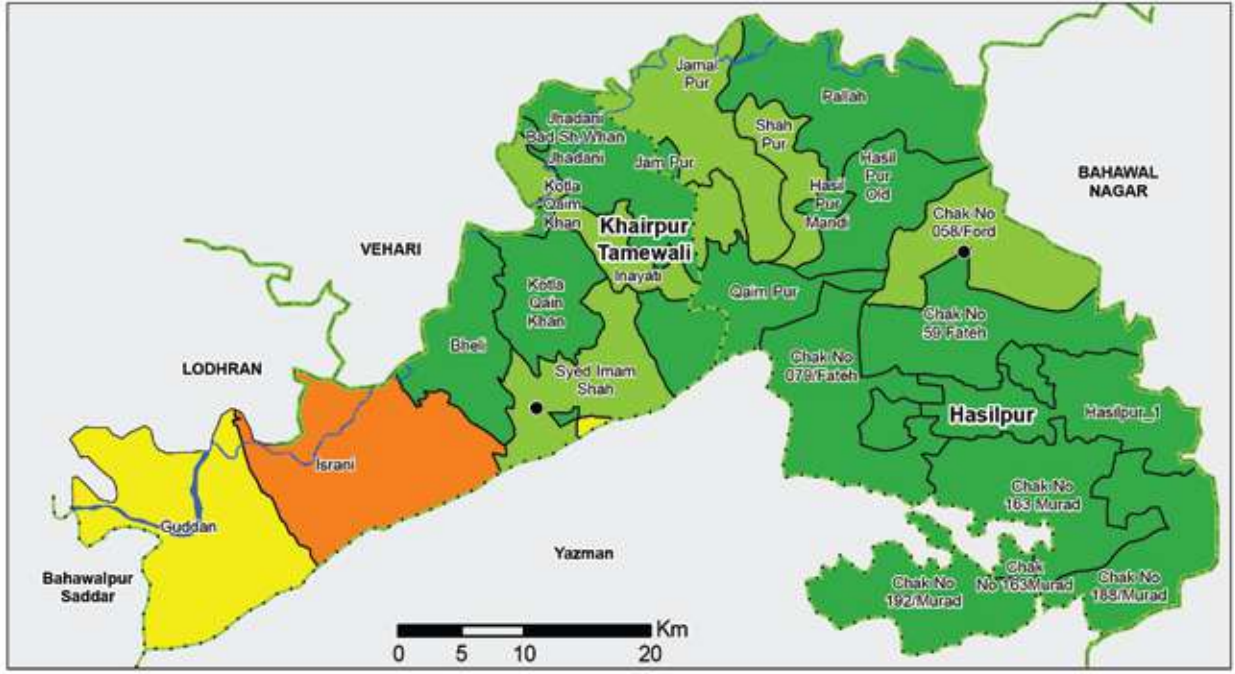
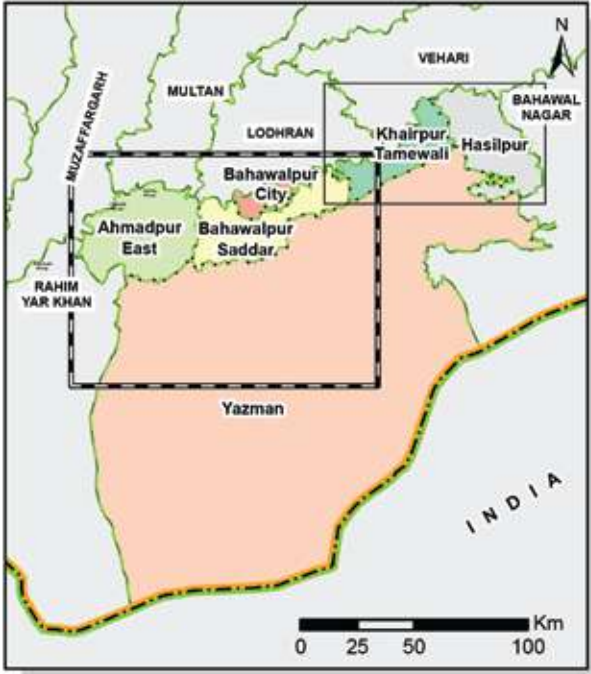
MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics,
Survey of Pakistan

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-MAY-2016-RSK-NDMA-FLOOD
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

COMPOSITE RISK



Legend

- District Headquarter
- Tehsil Headquarter
- Composite Risk
 - Very Low
 - Low
 - Medium
 - High
 - Very High
- River and Water Body
- Union Council Boundary
- Tehsil Boundary
- District Boundary
- Line of Control
- Provincial Boundary
- International Boundary

Multi Hazard Vulnerability & Risk Assessment, Bahawalpur, Punjab, Pakistan



MAP INFORMATION

Data Source(s):
Pakistan Bureau of Statistics,
Survey of Pakistan

Datum: WGS 1984
Units: Degree

Map No: MHVRA-PUN-603-MAY-2016-RSK-NDMA-COMPOSITE
Prepared by: Project Management Unit, NDMA
Last Updated: 20th April, 2017

DATA SOURCES

| DATA TYPE | DATA SOURCE |
|---|--|
| Agriculture Based Industries | Directorate of Agriculture, Crop Reporting Service, Punjab, Lahore x(Development Statistics-2015) |
| Animals Slaughtered in Recognized and Un-recognized Slaughter Houses by Type in the District | Directorate of Livestock and Dairy Development (Ext.) Punjab,Lahore |
| Annual Cellular Subscribers | Pakistan Telecommunication Authority (PTA) |
| Area Sown under Wheat, Rice, Cotton and Sugarcane in the District | Directorate of Agriculture, Crop Reporting Service, Punjab, Lahore. |
| Area Sown by Mode of Irrigation | Bureau of Statistics, Punjab, Lahore (2013-2014) |
| Birth Registration | Multiple Indicator Cluster Survey (MICS) Punjab: 2011 |
| Broadband Subscribers by Technology | Pakistan Telecommunication Authority (PTA) |
| Building Distribution | PBS |
| Canal System | Agriculture Department Punjab |
| Cellular Communication Towers | Pakistan Telecommunication Authority (PTA) |
| Child Delivery - Location and Type of Assistance | Pakistan Social and Living Standard Measurement (PSLM): 2013-2014 |
| Child Statistics | Multiple Indicator Cluster Survey (MICS) Punjab: 2011 |
| Climatology | http://www.Myweather2.Com/City-Town/Pakistan/Khushab/Climate-Profile.aspx http://en.Climate-Data.Org/Location/3077/ |
| Diesel and Electric Tube wells Installed by Ownership | Directorate of Agriculture Crop Reporting Service, Punjab, Lahore. |
| Distribution Of Land Use/ Land Cover (LU/LC) | Space and Upper Atmosphere Research Commission (SUPARCO) |
| Education Facilities | School Education Department, Government of Punjab |
| Elevation Bands | National Aeronautics and Space Administration (NASA) |
| Establishment of Private Poultry Farms in the District (2013-14) | Directorate of Poultry Research Institute, Punjab, Rawalpindi |
| Flood Inundation Frequency | National Disaster Management Authority (NDMA) |
| Geology | Geological Survey of Pakistan (GSP) |
| Health Facilities | Health Department Punjab/ District Health Information System Punjab (Government Of Punjab) |
| Household Characteristics | Multiple Indicator Cluster Survey (MICS) Punjab: 2011 |
| Industries | District Officer (E&IP), Khushab |
| Key Indicators - Child Mortality Statistics | Multiple Indicator Cluster Survey (MICS) Punjab: 2011 |
| Khushab City Land Use Map 2013 | NDMA |
| Landline Service | District Pre-Investment Study – 2012, Directorate Of Industries, Punjab Poonch House, Multan Road, Lahore. |
| Literacy Rate- 2015 | 2015 Projected |

| DATA TYPE | DATA SOURCE |
|--|--|
| Literacy Ratio | Pakistan Social and Living Standard Measurement (PSLM): 2014-2015 |
| Major Industries | District Officer(E&IP), Khushab |
| Metaled Roads Length By Type Zone and District | Planning & Design Directorate, Punjab Highway Department, Lahore. |
| Mineral Productions | Directorate General, Mines and Minerals, Punjab, Lahore. (Development Statistics-2015) |
| Motor Vehicles 'Registered' By Type | Additional Director General, Excise & Taxation, Punjab, Lahore. |
| Number of Cattle, Sheep and Buffaloes in the District | Source:-Census of Agriculture 2000 & 2010- Census of Livestock 1996 & 2006 |
| Number of Registered Factories & Employment Level | Bureau of Statistics, Punjab, Lahore |
| Number of Work Animals by Type in the District (2006) | 2006 Census of Livestock, Agricultural Census Organization, Pakistan Bureau of Statistics |
| Percentage of children that have been immunized by Type of Antigen- Based on record and recall | Pakistan Social And Living Standard Measurement Survey (PSLM) 2013-2014 |
| Population | Population Census 1998, Population Census Organization, Government of Pakistan. Projections were calculated on the basis of the Inter-Census Growth Rate for the two Censuses Of 1981 And 1998, and do not factor in changing Fertility And Migration Patterns. |
| Population by Age Group, Gender and Rural /Urban | Population Census 1998 |
| Population by Mother Tongue- 2015 | 2015 Projected |
| Population Distribution | Pakistan Bureau Of Statistics (Population Census 1998, Population Census Organization, Government Of Pakistan. Projections Were Calculated On The Basis Of The Inter-Census Growth Rate For The Two Censuses Of 1981 And 1998, And Do Not Factor In Changing Fertility Patterns) |
| Population on Basis of Religion-1998 | 1998 Census |
| Post-Natal consultations of the District | Pakistan Social and Living Standard Measurement (PSLM): 2013-2014 |
| Railway Network | Punjab Development Statistics 2011 / Respective District Offices |
| Sales of Fertilizer by year 2013-2014 | Director General Agriculture, Punjab, Lahore |
| Socio-Economic Statistics of The District Khushab (In Percentage) | Multiple Indicator Cluster Survey (MICS) Punjab: 2011 |
| Threshers and Harvesters in the District (2012-13) | Directorate of Agriculture Crop Reporting Service, Punjab, Lahore. |
| Total tractors in the District by 2004 Census | 2004 Agricultural Census Wing & Pakistan Bureau of Statistics, Government of Pakistan, Lahore) |
| Tractors by Make in District (2012-13) | Directorate of Agriculture Crop Reporting Service, Punjab, Lahore |
| Types Of Health Facility | Health Department Punjab |
| Veterinary Institution in the District | Department Of Livestock & Dairy Development, Khushab |

Developed by

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