发挥新型举国体制优势 提高地质灾害防治能力

中国地质条件复杂,地质灾害严重,只有发挥新型举国体制优势,建立高效科学的地质灾害防治体系,全面提高地质灾害防治能力,才能确保人民群众生命财产安全。

(1)围绕新型城镇化建设和乡村振兴战略,开展山区大比例尺地质灾害调查与风险评价。国际上大多发达国家已完成 1∶1万地质灾害调查与风险评价工作,中国在地质灾害高易发区开展了 1∶5万滑坡崩塌泥石流灾害调查,调查精度明显偏低,防治基础十分薄弱。建议以县为单元,围绕新型城镇化、乡村振兴和新农村建设,兼顾基础设施和重大工程建设,开展山区城镇、拟规划振兴的乡村 1∶1万或 1∶5 000比例尺地质灾害调查与风险评价,夯实地质灾害防治基础,并划定宜建区和禁建区。在禁建区内禁止规划和建设新的工业与民用建筑,对禁建区内已有的工业与民用建筑采取搬迁避让或工程治理措施。

(2)充分发挥新型举国体制优势和自然资源部职责,借鉴国际地质灾害风险管理理念,推进地质灾害防治管理法制建设,从源头管控地质灾害风险。一是借鉴国际地质灾害风险管理的理念、流程和标准,进一步健全中国地质灾害防治管理体系;二是将中国建设用地地质灾害危险性评估改为国土空间开发利用地质灾害风险评估,提高评估的针对性和准确性;三是加强基层自然资源部门地质灾害防灾减灾专业技术人员的配置,增强地方自主防灾减灾能力。建立常态化多部门协作、数据资料共享的地质灾害防治长效协调机制,提高统筹协调能力。强化汛期和重点地区的巡查排查、应急演练、宣传培训、专业指导工作,提升群测群防监测和应急避险能力;四是充分发挥自然资源部职责,结合自然资源开发利用和保护、国土空间规划、国土空间管制与利用和生态修复管理,将地质灾害风险评价与区划结果纳入到国土空间规划的编制中去,并将之形成法定程序,逐步制定地质灾害或自然灾害防治法,建立法律约束机制,从源头管控地质灾害风险。

(3)加强科技创新驱动,全面提升地质灾害早期识别、预警预报和综合防治水平。一是研究隐蔽性地质灾害成灾背景-诱发机制-成灾特征,建立早期识别关键技术,加强极端降雨、地震等异常条件下的地质灾害风险评估;二是加强地质灾害监测预警研究,建立基于地质灾害发生机理和演化过程的专业监测预警技术,结合搬迁避让和工程治理,逐步将群测群防网络体系转变为群专结合,重点地区和重大地质灾害隐患以专业监测预警为主的网络体系;三是基于地质灾害形成机理与演化过程控制理论,开展地质灾害防治结构体系设计与施工关键技术创新,破解地质灾害应急处置、治理工程中的卡脖子技术;四是研发基于大数据和智能技术的地质灾害综合防控技术方法体系,为地质灾害防控提供全新的解决方案。

(4)推行地质灾害风险管理,引入地质灾害保险制度,建立地质灾害防治责任分担的长效机制。中国在地质灾害防治管理中采取了一系列卓有成效的措施,取得了令人瞩目的成就。但中国(不含香港地区)的地质灾害风险管理还处于刚刚起步的阶段。地质灾害风险管理是一项复杂的工作,它不是一个纯技术决策问题,而是集技术决策、政府管理(政策)、社会参与、法律制定及成本核算、效益分析等为一体的综合决策行为。完全杜绝地质灾害发生是不可能的,地质灾害引起的风险将永远存在,要想主动有效地预防和减轻地质灾害,只能对地质灾害进行风险管理。并在地质灾害风险评估的基础上,引入地质灾害保险制度,逐步建立地质灾害防治责任分担的长效机制。

(5)发挥地质灾害堆积体的资源优势,加强对地质灾害堆积体生态修复与土地开发利用。滑坡、崩塌、泥石流等除造成灾害,引起人员伤亡和经济损失外,其堆积体还是山区难得的地形较平缓的土地资源。对这些较稳定的堆积体进行生态修复、土地综合整治、泥石流疏导,仍可作为山区城镇和村庄建设用地,或耕作用地。在地质灾害治理工程中,应做好以下几个结合:一是地质灾害治理工程与国土空间规划、土地利用整治工程、生态环境修复工程紧密结合;二是边坡治理中的削坡-弃渣-压脚与土地整理中的形成平台-土地综合开发利用相结合;三是建(构)筑物的桩基础设计-施工与滑坡工程治理中的抗滑桩设计-施工相结合;四是滑坡治理工程中的滑坡防水-滑坡排水与移民搬迁安置点的地面排水-地下排水工程相结合;五是滑坡治理工程中的生物工程措施与生态环境修复工程相结合;六是利用岩土工程新技术新方法解决岩土问题与土地整治工程兴利避害相结合等。

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二〇一九年五月五日

Maximising the Advantages of the New National System for Improving the Ability to Prevent and Mitigate Geological Disasters

China's geological conditions are complex and geological disasters are serious. Only by maximising the advantages of the new national system, building an efficient and scientific geological disaster prevention and mitigation system, and comprehensively improving the ability to prevent and mitigate against geological disasters can we ensure the safety of people's lives and property. The following recommendations outline how these objectives can be achieved.

(1) Carry out large-scale geological disaster investigation and risk assessment in mountainous areas, focusing on the new Urban Construction and Rural Revitalization Strategy. Most developed countries have completed geological disaster investigation and risk assessment work at 1∶10,000scale. China has carried out a 1∶50,000 landslide and debris flow disaster investigation for high-risk areas. The survey accuracy is obviously low, and is a weak foundation for prevention and control. The recommendation is to treat the county as a basic unit to carry out geological disaster investigation and risk evaluation at scale of 1∶10,000 or 1∶5,000, based on new urbanization, rural revitalization and new rural construction. Infrastructure and major project construction should also be taken into account. In addition, the fundamental basis for geological disaster prevention and control should be strengthened, and suitable construction areas and prohibited construction zones planned. Planning and constructing new industrial and civil buildings in the prohibited construction area should be forbidden, and relocation and avoidance or engineering control measures for existing industrial and civil buildings in the prohibited construction area should be adopted.

(2) Maximise the advantages of the new national system and the role of the Ministry of Natural Resources; learn from the international geological disaster risk management concept; promote the legal system construction of geological disaster prevention and mitigation; control the risk of geological disasters at the source. Firstly, we recommend learning from the concepts, processes and standards of international geological disaster risk management to further improve China's geological disaster prevention and mitigation system. Secondly, moving from risk assessment simply for construction land to risk assessment for overall land use planning (the development and utilization of land), and improving the relevance and accuracy of the assessment. Thirdly, improving the allocation of professional technicians at the grassroots level in Natural Resources departments, and enhancing local independent disaster prevention and mitigation capabilities. This will include establishing a long-term coordination mechanism for geological disaster prevention and control with improved through the normalization of multi-sectoral collaboration and data sharing. In addition, strengthening inspections, emergency drills, publicity training, and professional guidance in flood seasons are key areas to improve group monitoring and prevention of emergency situations. Fourthly, formulating and enacting a legal framework for geological disaster prevention and mitigation will establish a legal restraint mechanism, and control the risk of geological disasters from the source. To achieve this, the functions of the Ministry of Natural Resources should be maximised, and natural resource development and utilisation, land use planning and controls, and ecological restoration management should be combined. Geological disaster risk assessment and zoning results must be incorporated into land use planning.

(3) Strengthen the driving force of scientific and technological innovation, and comprehensively improve the early identification, early warning and forecasting and prevention of geological disasters. Firstly, we need to study the underlying causes and mechanisms of geological disasters and establish key technologies for early identification, in particular the risk assessment of geological disasters under abnormal conditions, such as extreme rainfall and earthquakes. Secondly, research into monitoring and early warning for geological disasters should be strengthened, in order to establish professional monitoring and early warning technologies based on the mechanisms and evolution processes of geological disasters. Engineering control structures should be combined with relocation and avoidance measures and a step-by-step transformation of monitoring networks towards state-of-the-art monitoring and early warning, forming a prevention and control network system for key areas. Thirdly, designs for geological hazard prevention structures should be developed and directly linked to the mechanisms and processes of hazard evolution. Key innovations in technologies and systems of control can overcome the difficulty in geological disaster emergency response and treatment engineering. The fourth is to use big data and artificial intelligence technology to develop a comprehensive prevention and control technology system for geological disasters, providing innovative solutions for geological disaster prevention and control.

(4) Promote geological disaster risk management, introduce a geological disaster insurance system, and establish a long-term mechanism for sharing responsibility of geological disaster prevention and control. China has adopted a series of fruitful measures in the prevention and control of geological disasters and achieved remarkable achievements. However, the geological disaster risk management in China (excluding Hong Kong) is still in its nascent stage. Geological disaster risk management is a complex task. It is not a purely technical decision-making problem, but a comprehensive decision-making behaviour that integrates technical decision-making, government management (policy), social participation, legal formulation, cost accounting, and benefit analysis. It is impossible to completely prevent geological disasters. The risks caused by geological disasters will always exist. To actively and effectively predict and mitigate geological disasters, risk management of geological disasters is a workable solution. On the basis of geological disaster risk assessment, a geological disaster insurance system should be introduced, and a long-term mechanism of sharing responsibility for geological disaster prevention and control gradually established.

(5) The resource potential of geological hazard accumulation bodies and their ecological restoration, land development and utilization. Landslides, collapses, mudslides, etc., in addition to causing disasters (including casualties and economic losses), nevertheless provide relatively rare land resources in mountainous areas. With ecological restoration and comprehensive land improvement of these relatively stable accumulations they can still be used as construction land for mountain towns and villages, or for arable land. In geological disaster control projects, the following combinations should be done: First, close integration of geological disaster control projects with national land use planning, land improvement and remediation, and ecological environment restoration; second, in slope cutting, the waste material can be compressed and used for land consolidation and platform creation, to ensure comprehensive land development and utilization. A third aspect is the pile foundation design of the buildings and the combination of construction and anti-slide pile design and construction in the landslide engineering treatment. Fourth, the landslide drainage in landslide control projects can be combined with the underground drainage at the resettlement site. Fifth, the bioengineering measures in the landslide control project are combined with the ecological environment restoration project, using new technologies in geotechnical engineering and new methods to solve the combination of geotechnical problems and land remediation projects.

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