

[International Symposium for Hanon-Maar Restoration]

The Meaning of Hanon-Maar Restoration and National Policy Progress Plan



Chair	SUH Youngbae Professor, Seoul National University
Moderator	LEE Kyungwon Administrative Assistant, National Promotion Committee for Restoring Hanon Crater
Welcome Remarks	KO Choong-seok President, Jeju International University
Congratulatory Remarks	LEE Kwang-hee Chairman, Jeju Free International City Development Center
Keynote Speaker	Mirosław MAKOHONIENKO Professor, Institute of Geo-ecology and Geo-information, Adam Mickiewicz University, Poland HYUN Sang-min Principal Research Scientist, Korea Institute of Ocean Science and Technology KIM Eunshik Professor, Kookmin University
Discussant	PARK Kwangwoo President, Korean Association of Botanical Garden and Arboreta LEE Sukchang President, Jayeonjeju
Rapporteur	KIM Dong Sik Director, National Promotion Committee for Restoring Hanon Crater

— **Mirosław MAKOHONIENKO** Hanon crater is an invaluable source of unique and long-term paleontological records. The geographic location of the crater captures the ecological evolution of the maritime environment in East Asia as caused by adaptation to climate change. Jeju Island is located in the transition zone between the broad-leaved evergreen forest of the north and the deciduous broad-leaved forest of the south, and the two types of vegetation have varied depending on climate fluctuations in the past. Microfossil records of Hanon crater reveal vegetation changes in the last glacial age and the post-glacial age in the Korean Peninsula. This indicates a correlation between global climate change and the surrounding maritime environment. Studies have found that when cold climate dominated, varieties of wormwood and bunch grass including gramineae pervaded the flora of Jeju Island, suggesting that the island had had continental climate. Also, an analysis of pollen flown into the crater from afar during

the Ice Age reveals the pollen originated from the evergreen oak, a subgenus of *Myrsinae* and a genus of *Podocarpaceae*. The population of the evergreen oak, growing in the temperate zone, albeit below 0.6 percent, seemed rather dense during the last glacial age. Jeju Island and southern Japan are thought to be largely attributable to regional climate variations caused by the distribution of warm ocean currents, and the regional distribution of specific flora serves as a key to understanding the origin.

— **HYUN Sang-min** Hanon crater is the only maar-type crater in the Korean Peninsula. The existence of the crater itself warrants a status of natural heritage and a significant academic motivation in paleoclimatology. In the early stage of volcanic eruption, the magma encountered a ground-water zone before reaching the ground surface, resulting in an explosive discharge of volcanic ash. In turn, the pyroclastic flow created a Tuff crater and ultimately formed a deep crater lake in a ground-water zone.

This crater lake is now what we call Hanon crater. The extant literature confirms that the crater is located in the transition zone of the Asian monsoon, keeping records of the monsoon in the layers of sediments. The paleoclimatological records found in the sedimentary layers are critical elements for analysis in predicting future climate change. As an archive of past atmospheric circulation and climate changes in East Asia, the Hanon Maar deposits do not only allow research on paleoclimatological fluctuations on a global as well as a regional scale, but could also serve as a basis for socioeconomic development and a geological tourist attraction for the purpose of environmental education. Thus, the site should be designated as a protected area so as not to be damaged further by construction and development.

— **KIM Eunshik** Created in the process of volcanic activities on Jeju Island, Hanon crater is the only maar-type crater that represents a national treasure containing tens of thousands of years of environmental information on climate, geology and vegetation. This largest crater of South Korea, made possible the constant inflow and the accumulation of a wide variety of deposits from different environments and climates. This could feasibly be dubbed as a time capsule of the environment, allowing a forecast of the future climate by drawing on paleoclimatological studies of the sedimentary strata. Unfortunately, Hanon crater has been damaged and has lost its original shape over time and has long been lost to public interest. It is even under threat of excessive land development these days. Experts worldwide who recognized the crater's value advised its restoration in 2012 World Conservation Congress(WCC). The South Korean government should heed their counsel and adopt the restoration plan as a key policy goal, with a view to shedding light on the crater's paleoclimatological and paleontological values as well as developing the volcanic site as a geological, ecological and tourist resource.

Despite the progress so far, the restoration project is suspended at the moment. This is due to a lack of understanding and interest on the part of Jeju local

government, regarding the value of and need for restoring Hanon crater. The governor is supposed to take the lead and draw attention of the Blue House, relevant agencies of the central government as well as the National Assembly and the international community, but the effort has fallen far short and he seems hardly committed to the project, which would represent the first case in the world of setting a standard formula for crater restoration. This is all the more reason we have high hopes for the new government, which pledged to restore the crater on the campaign trail. President Moon said that “as a stepping stone to South Korea’s higher international standing in terms of environmental policy” with the aim of earning the island a reputation as the hub of East Asia’s environmental issues and bolstering the competitiveness of the tourism industry.

The restoration project does involve bringing back the original terrain, crater lake as well as vegetation of Hanon crater ruined beyond recognition after more than five centuries of farming and agricultural activities and establishing the basis to recover the cultural, historical records of lost villages. A successful construction of a global standard restoration model of the crater will advance South Korea to the forefront of natural environment restoration technology, and enhance its reputation and influence in environmental diplomacy. It also provides an opportunity to establish a new paradigm for tourism and environmental affairs by hosting international conferences discussing global environmental issues as well as tourism.

— **SUH Youngbae** A view shared by all presenters on Hanon crater is that it is an ecological time capsule or an archive of tens of thousands of years of environmental information on climate, environment, geology, vegetation, etc., and that we can offer a projection on future climate change using the data obtained from the paleoclimatological and paleontological surveys of the strata. The question is how we are going to restore this major national environmental resource. A determined will on the part of the local population, the local government as well as

the central government is called for, and we should be reminded that a bottom-up approach has proven most effective on environmental issues.

— **PARK Kwangwoo** Restoring the only maar-type crater in the Korean Peninsula is a singular undertaking, since it paves the way to obtaining cumulative data on paleontology and paleoclimatology from the sedimentary strata of some forty- or sixty-thousand years ago. By coupling the data with climate information collected from maar-type craters in China and Japan, we can estimate the past climate of East Asia with more precision. The joint historical climate data processing among the three countries could, in turn, improve the accuracy of future climate change forecast, contributing to the prevention of and response to natural disasters. A proposed restoration of Hanon crater and a relevant research center would mean that South Korea could operate the only research base with historically traceable data regarding paleoclimatology, paleontology and the impact of atmospheric movement in the past.

It is imperative to restore the invaluable resource, which has been damaged to the point of destruction largely due to rapid industrialization since the 1970s and the development of neighboring areas since the 2000s. Global experts have recognized the need to stop further damage and conserve the site, passing the proposal for restoring Hanon crater at 2012 Jeju WCC. Construction inside the crater has seriously damaged paleontological areas by mixing up layers of chronological information in the deposit into an irretrievable mess. We need to come up with the details on effect the restoration that is expected to have on sectors of national long-term development. The geological strata analysis can compile important data on the trend of long-term ecological change on the Korean Peninsula and will also help develop a high-precision forecast technology, once it is coupled with the long-term analysis of the ecosystem of Mount Halla.

— **LEE Sukchang** The Seogwipo local government scrapped its plan for an off-season baseball training field at Hanon crater in 2002, after causing an uproar from civic and environmental organizations. Fifteen

years since, a bid for restoration gained traction once again with the WCC in 2012. It was mostly thanks to serious interest and support from expert groups and citizens who drew global attention to its value and the restoration project that Hanon crater managed to avoid random development. The restoration of the crater is the first of its kind in the world, meaning South Korea is poised to set the global standard for maar-type crater restoration. Once recognized as the leader in natural restoration technology and capability to blaze a new trail in the environment and tourism sectors, South Korea will naturally be able to raise its international standing. I suggest establishing a task force to draw up a strategy to implement the presidential campaign pledge, enlisting lawmakers, the local government, committee members, experts as well as the local population. A systematic activity of the new task force will make the restoration project a signature environmental policy of the new government.

● ● ● Policy Implications

- There are several challenges for the new government to put the planned restoration of Hanon crater on the national policy agenda: First, it should clearly present the value of the crater and logically justify the restoration project so that the project may be conducted with a clear sense of obligation to restore the natural environment; second, a task force joined by relevant agencies, civic groups, experts and representatives of the local population should be formed immediately to draw up an execution strategy for the campaign pledge; third, a close cooperative network among government agencies(both central and local), relevant organization, International Union for Conservation of Nature(IUCN), etc. should be established; lastly, the Jeju local government should take the initiative in forming a consensus among the landlords, local residents and the general public and a shared understanding of the rationale for the restoration project.

How to Improve Eco-efficiency for Achieving Carbon-free Society



Chair	JEONG Dai Yeun Director, Asia Climate Change Education Center of Jeju Special Self-Governing Province
Keynote Speaker	Frank RIJSBERMAN Director-General, Global Green Growth Institute
Discussant	Nelson DEVANADERA Executive Director, National Palawan Council for Sustainable Development, Philippines Scott BAUM Professor, Griffith University, Australia António ABREU Vice Chair, European Environment Advisory Council, Portugal Mahesh PRADHAN Chief, Program Management, International Environmental Technology Center, UNEP
Rapporteur	JANG Kwang-Sub Researcher, UNESCO World Network of Island and Coastal Biosphere Reserves Jeju Office

— **Frank RIJSBERMAN** Starting with the Brundtland Report in 1987, various terms for ecological efficiency and green growth have circulated at the World Business Council For Sustainable Development(WBCSD) in 1992 and the Rio+20 Conference 2012. The Global Green Growth Institute(GGGI) engages in activities to support countries around the world in their transition towards a new model of green economic growth, that is environmentally sustainable and socially inclusive. First of all, the GGGI is dedicated to developing policies, mobilizing investment and sharing knowledge to implement the concept of eco-efficiency. Mainstreaming the concept of eco-efficiency requires us to meet Nationally Determined Contribution(NDC) targets and achieve Sustainable Development Goals(SDGs). Today, countries over the world are making diverse efforts to achieve a carbon-free society. India lowered solar energy prices and stopped the operation of coal-fired power plants this year; and China's renewable energy accounts for 80 percent of its total use of energy. However, many Asian countries suffer from serious air pollution due to coal-fired power generation, rais-

ing concerns that they may face more serious consequences unless they invest in renewable energies.

Even though U.S. President Trump decided to break away from the Paris Agreement, other countries still have a firm will to meet the NDC targets. South Korea, China and Japan, which account for 76 percent of electricity production and consumption in Asia, and Russia are studying a way to jointly establish an energy grid, with China considering a measure to supply new renewable energies with its Green Belt initiative. The GGGI engages in various activities to support efforts to achieve green cities, water sufficiency, and sustainable landscapes and energies. With a strategic partnership with the Green Climate Fund(GCF), the GGGI mainly supports governments but it also cooperates with the civil sector, such as banks, investors and business enterprises pursuing eco-efficiency. I wish Jeju Island could introduce a carbon-free society by creating a network dedicated to green growth and eco-efficiency.

Green growth and eco-efficiency can work hand-in-hand to promote carbon-free, climate resilient and inclusive societies. Jeju's leadership in reaching