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Ten Years of Sloping Land Management

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Ten Years of Sloping Land Management





“*The Ministry of Land and Environment Protection and relevant organs should briskly conduct joint research and academic and information exchanges with scientific research institutions of other countries and participate in international conferences and seminars, so as to positively introduce the advanced science and technology.*”

~ Kim Jong Un





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Preface

Respected **Kim Jong Un** said:

“We should briskly conduct scientific and technological exchanges with other countries and international organizations. In the sector of land administration and environment conservation there are many things to be introduced from among the world trends and foreign countries’ advanced technologies”.

Agroforestry in the Democratic People’s Republic of Korea (DPRK) presents its own unique set of challenges. With limited arable land, more than 80% of which on the slopes of its impressive mountains and uplands, a large portion of the country’s natural forests were damaged and destroyed due to natural disasters, internal pressures, and the unfortunate sanctions by other countries. However, at that time, the Ministry of Land and Environmental Protection (MoLEP) stepped forward to promote and implement new agroforestry management methods.

Consequently, an agroforestry experiment was begun in North Hwanghae Province to test these new and inspiring concepts. The results were hugely successful and clearly showed that this was an effective way to combat, and even reverse, the environmental damage to sloping lands in the DPRK. Not only was this a solution to the environmental challenges facing these areas, but these practices also had the added benefit of increasing the economic standards of the local residents. Based upon these findings, proper management of the sloping lands became a crucial part the economic strategy of the DPRK.

Of course, an important element of the DPRK’s success in agroforestry has been working in cooperation with other interested agencies, and the sharing of knowledge and talent. Learning, and adopting, advanced technologies from other countries has been an important element in staying in step with the trends of development in science and technology. After all, obtaining the best results from sloped land management is a complex endeavor, and we must consider the various eco-regional specifications, including not only the location of the slope, but also its watershed, eco-landscape, and socio-economic development impact. Agroforestry management is not simply intercropping; it should be developed as much as possible in a multi-dimensional and integrated framework, by combining forestry, agriculture, and livestock to meet the various needs of its inhabitants and stakeholders. Using state-of-the-art technologies such as landscape ecological principles, pedology, physiology, biology and



satellite information analysis, a system can be created that sustainably meets the needs of the people that it serves.

Over the past 10 years, many achievements have been made in the management of sloping lands by means of agroforestry. This book serves as a testament to the experiences of the fantastic agroforestry management teams in many counties, especially those in Suan County in North Hwanghae Province. We hope that this book will be a valuable resource for all of those working in the field of forestry management and that, together, we can make the mountains of our motherland come alive!

Ministry of Land and Environment Protection





Foreword

Over the last decades, DPR Korea has been affected by grave natural and other disasters leading to the loss of livelihoods and decreased food and environment security. To restore degraded sloping land, the Ministry of Land and Environment Protection of the DPR of Korea (MoLEP), the Swiss Agency for Development and Cooperation (SDC) and the World Agroforestry Centre (ICRAF), have implemented the Sloping Land Management Program in order to promote food security and the multi-purpose use of trees to transform landscapes and livelihoods.

Since 2004, the program has integrated agroforestry technology into sloping land management practice, which proved to improve both food security and environmental sustainability by establishing pilot projects in many counties of North Hwanghae province, including Suan county, and achieving positive results from their expansion into other regions.

We are very grateful for these successes and express thanks to personnel and scientists and the technicians at MoLEP who exerted themselves for the success of this project.

The Ministry of Land and Environmental Protection (MoLEP) has embraced the core tenants of the project with the aim of upscaling its methodology. Legal provisions have been put in place that formalize the rationale used by the sloping land user groups in keeping with state requirements. The Swiss Agency for Development and Cooperation will continue to reinforce the achievements with the collaboration of MoLEP and ICRAF in order to contribute to the sustainable nationwide multiplication of successes in DPR Korea.

Thomas Fisler

Director of Cooperation
Swiss Agency for Development and Cooperation
Swiss Cooperation Office Pyongyang, DPR Korea





A 10-Year Journey of Restoring Sloping Forests

Kim Kwang Ju

Project Management and Consulting Services, MoLEP

Recognizing that the situation needed urgent attention in August 2003, MoLEP and the DPRK office of the Swiss Agency for Development and Cooperation (CDC) met to discuss solutions for restoring the forests and supporting local food security. This, and subsequent cooperative meetings led to the project for sloping land management.

Late 2003, officials from MoLEP, the SDC, and other concerned agencies and consultants convened at the People's Cultural Palace for a National Seminar on Development of the Sloping Land Management Project. The convention was followed by a workshop on the sloping land management (SLM) project in Suan County. These meetings helped form several principles and strategies that became the foundation of the sloping land management efforts that are still being carried out today.

The first phase of the project began in earnest during the spring of 2004. Applying the methods and principles of agroforestry, the initial pilot project was an immediate success, and clearly demonstrated to all involved the need to extend the scale of the SLM project and create additional sloping land management teams.

The second phase extended the area of the project and focused on creating practical models that could be replicated by future groups. During this second part of the project, it was also decided to introduce double-cropping in some areas. In the initial trial, early-variety potato was planted as the first crop, and upland rice as a second. These crops were sown between larch and Korean pine that were planted in small patches along the slope in 8-10 meter intervals. The importance of diversifying crops according to soil conditions was also emphasized.

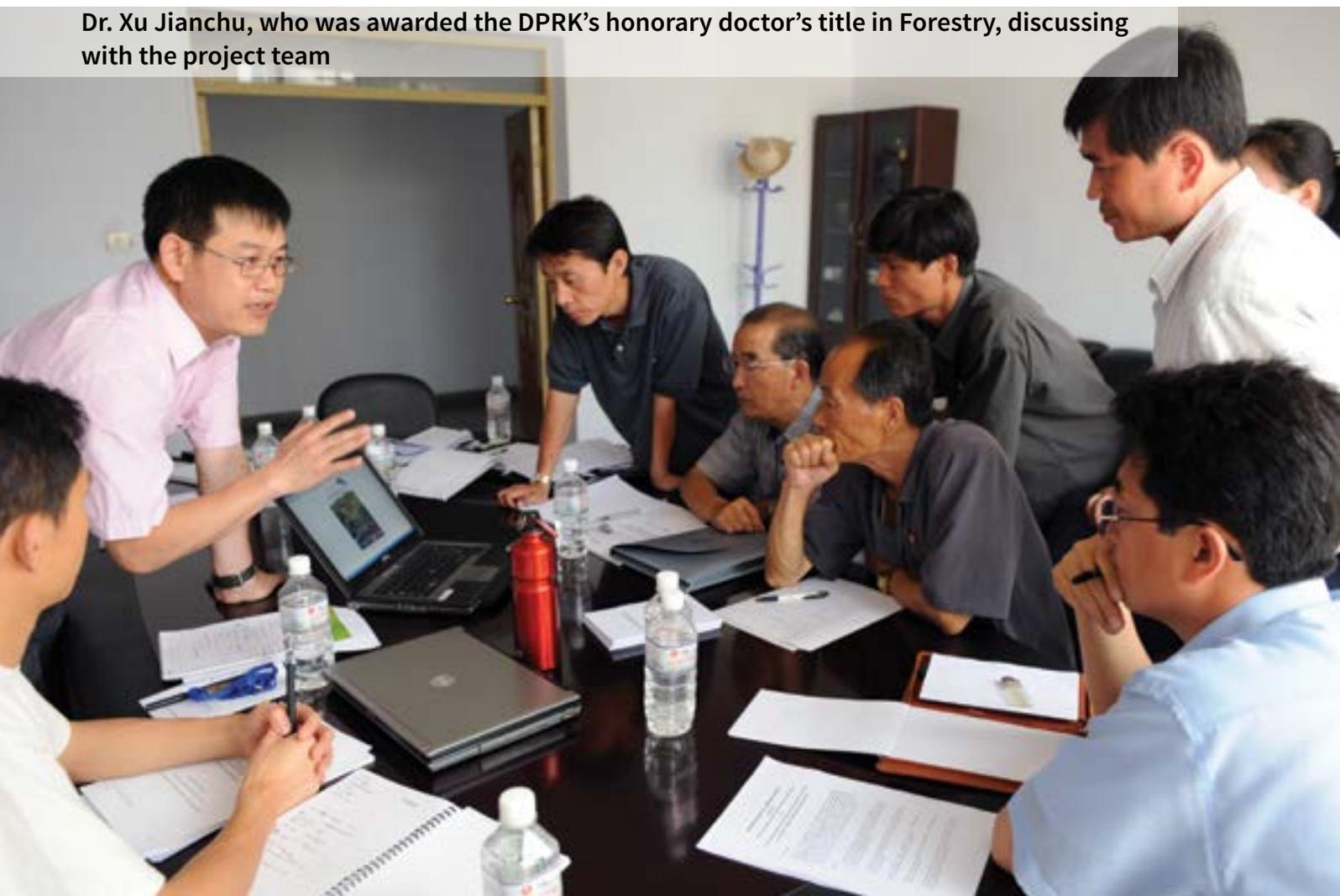


To maintain positive momentum during this phase of the project, as well as to re-energize group members, a delegation of Swiss MPs was invited to visit some of the sloping land user groups. Having the opportunity to share their progress, and learning about the international interest and impact of their work was a great encouragement to all.

By 2007, the project had advanced to phase three, and was extended to four cities. The focus of this phase was to create and mobilize cross-disciplinary teams. For technical support, Dr. Jianchu Xu from the World Agroforestry Centre (ICRAF) in Yunnan, China (currently known as ICRAF's East and Central Asia Regional Headquarters), visited the sloping land user groups in many counties to provide further education. In appreciation of his contributions to promote the development and dissemination of agroforestry management within the country, Dr. Xu was awarded an honorary doctorate by the DPRK.

During the 3 years of phase three, additional infrastructure was developed for the land user groups. Technology Extension Rooms (protected spaces for collaborative new plant varieties could be grown and observed) were set up by each county's Forest Management Board, and resting rooms (a designated space for user group members to meet and hold relevant activities) were provided to better facilitate the sloping land user group's needs and activities. Group members were also encouraged to participate in exchange visits with other user groups in other counties. This spirit of cooperation between user groups—which included the exchange of information, experiences and better seed varieties—helped all of the user groups to become more self-sufficient, and empowered them to develop their own small-scale nurseries, instead of relying on centralized distribution.

Dr. Xu Jianchu, who was awarded the DPRK's honorary doctor's title in Forestry, discussing with the project team





Phase four of the project began in 2010. The aim of this step was straightforward: to extend the project to more and more cities, and to ensure its sustainability long into the future. Phase five continued this expansion into the remaining eco-zones of North Hwanghae Province.

Thanks to its success in rejuvenating damaged sloping lands, agroforestry management has received national appreciation, and dignitaries have visited the project sites to see first-hand the transformation of the once-barren slopes.

The 4th National Workshop on Agroforestry Development took place in August 2013 and SDC accepted the proposal on development of the Agroforestry Management Strategy and Action Plan suggested by MoLEP and decided to work on the project.

During the past decade of agroforestry management, many positive changes have been brought about that would not have been possible were it not for the hard work and contributions by so many individuals and organizations. In the eyes of the SDC, ICRAF, FAO and residents of the area, this project keeps developing with a high measure of success.

SDC delegation visits the Sohung county SLM site in N. Hwanghae Province





The Power of Trees, The Power of People

Dr. Jianchu Xu
Principal Scientist and Regional Coordinator
ICRAF East and Central Asia Region

Early one fall morning, while the sun was still rising in Suan County, two user group leaders weaved their way across fields on a rocky hillside. They had come to tell the visitors about the exciting news of the help they have received from the Swiss Government and the benefits of the Sloping Land Management project.

Some of the visiting farmers had left their homes long before dawn, walking several hours to reach the slopes designated by MoLEP. “It is proof of the way that sloping land has changed their lives that these farmers are willing to come so far on a day like this,” says Johan Ramon, who coordinates the Sloping Land Management project at SDC. When Johan first arrived in 2006, he found a scene of desolation. The hilltops and slopes were bald and treeless, while the soils were heavily degraded and full of gully erosion. Now, the same sloping land boasts a wood lot, a network of dense hedges, tree nurseries, and fertile slopes growing corn, upland rice, potatoes and beans. There is also a field house for training, storage, and overnight lodging.

It took the user group leaders most of the morning to describe how they originally organized into a user group, and put the land management training they had received into practice. The first to speak was Ri Sun Ok, a very energetic woman. She explained that she used to harvest very little from the slopes, even after several years of intensive cultivation. Now, however, on exactly the same plot of land, the yield has doubled, thanks to the increase in soil fertility brought about by planting trees, hedgerows, as well as rotating legume crops. “My family has more to eat now, and even some surplus to exchange or sell,” she said.

Mrs. Kim Sun Hwa said the steep piece of land they used to farm was heavily eroded, providing them with minimal yields. Dr. Kim Kwang Ju, chief advisor for the project, suggested they should plant biological hedgerows with trees to prevent erosion. “I hesitated at first,” she said, “but Dr. Kim convinced me in the end.” Since then, two user groups have established hedgerows

At the beginning of sloping land management



After the implementation of sloping land management





everywhere with tree seedlings provided by the project. “The soil erosion is much reduced, we rotate different crops, and our yields have increased,” said Mrs. Kim and Mrs. Ri proudly.

Ri Sun Ok told the visitors that the fruit trees they are growing on the sloping land have helped to improve their income. “In the past, we did not have any cash before harvest,” she said, “but now we have peaches and nuts which we can sell at the local market or exchange for other products.” Kim Sun Hwa said that, besides fruit trees, they had planted grass-strips together with trees as hedgerows. “Slopes provide us with fodder for the rabbits and goats, and we now have healthy livestock and people.”

Stories like this from user groups in Suan County provide a glimpse of the benefits of agroforestry. The user groups are very proud of their success. Mrs. Ri said: “We have received many visitors, including government officials, other project members and other user groups; we have even been featured on our national TV program. We are agroforestry experts now!”

Around the world, agroforestry provides a living for at least 1.2 billion people. About 0.6 billion hectares of agricultural land have more than 20% tree cover, and 160 million hectares more than 50%. Agroforestry is not only a land-use practice—it is also about people’s empowerment. It enfranchises people, and emancipates them through knowledge.

The successes from Suan County, in the DPR of Korea, demonstrates that agroforestry—which combines land, labor, and knowledge—can make an improved world, a better life, and a greener landscape. The DPR of Korea has a much better future with more trees and empowered people, living in harmony.





Our Success: From Squatters to Stewards of the Land

Kim Myong Chol

Forest Ranger, Rinsan County, North Hwanghae Province

Kim Myong Chol's job as a forest ranger began 18 years ago, shortly after the 1995 floods devastated most of North Hwanghae Province.

Having been deprived of their food sources, residents began squatting on forest land, harvesting the remaining trees and tried growing crops on the sloping lands. Because these new residents would employ slash-and-burn techniques to clear the land, the risk of forest fires rose dramatically. "With the repeated natural disasters, exacerbated by soil erosion, the condition of the forests got worse and worse," Kim said, "my job has been a tough one."

In order to halt the degradation of the forest, the rangers helped to organize the squatters into groups of sloping land users. "We changed our own roles, from forest police to forest facilitators," Kim stated with pride.

Local situation analysis





An important aspect of these new groups was to foster an environment of participation and cooperation. Encouraging the groups to join in the planning process for their own fields helped create a higher sense of ownership and pride in their work. Working together to help combat soil erosion, they created new borders around the contours of the sloping fields. In these borders, they planted grass strips of alfalfa and red clover, which doubled as an ideal animal fodder. The

“*We changed our own roles, from forest police to forest facilitators.*”

strips prevented soil erosion remarkably well, and the new trees and crops benefited from improved fields and nutrient retention. Additionally, solving the problem of feed for the animals was a great encouragement to many of the group members. Through additional training, the users learned that soil fertility could be improved through the use of organic fertilizers produced by the animals that they were raising, and that crop harvest could be increased considerably each year. Kim smiles fondly when he recalls the transformation he saw using these new techniques: “It was a miracle!”

The ideas of grass strips, tree planting, and crop allocations were new to the user groups. Even the tools that they had available were not sufficient for their new tasks. “MoLEP’s technical staff provided us with a lot of support,” explained Kim.

Not surprisingly, the users saw many improvements after adopting the new methods. Previous approaches with chestnut, for example, would not yield a harvest until the tree was more than 10 years old. The newly-grafted trees, however, could be harvested after only 5 years, with a yield of dozens of kilos. Of course, the earlier harvest timeline greatly boosted income for the user groups, and rumors of their successes spread throughout the county.

Kim observes: “Having seen firsthand the benefits of agroforestry, we can confidently say that it is the foundation of sustainable sloping land management. The superiority of this approach is evident, and many people from other regions and counties are visiting us to learn from our experiences.”

“With the help of agroforestry development, we can prevent soil degradation, protect the forest, and even get food from it! Now, all of the hardships at the beginning of my work feel like a long-gone past. I am proud of myself, being not only a forest ranger, but also a technical defender and disseminator of agroforestry development.”







Growing Rice on Sloping Lands

Ri Sun Ok

Sloping Land User Group Manager, Suan County, North Hwanghae Province

Until 2005, no one in DPR Korea had cultivated rice on sloping lands. Instead, most user groups had been focused on cultivating corn, white and sweet potato. These were usually sown between rows of trees, such as larch, pine, and chestnut that were planted in parallel lines around the contour of the fields, because they didn't think other food crops were viable in sloping land areas. However, the first upland rice trial in Suan County changed this perception.

“That first year, only some of the members planted upland rice. The rest of the group insisted that they would invest only in crops they trusted to grow, and that planting rice was too risky for a whole year's work,” Ri explained. “Not that anyone could blame them; they were just worried that they would lose everything.”

When they were younger, a few of the elders of the group had worked with researchers studying upland rice. These elders took the risk of trying rice, and planted the first fields.

Ri recalled: “At first, we were so clumsy with upland rice, because it was the first time we had ever tried it. But even so, that first year we harvested more than 2 Mt/ha.”

These admirable first-year results were enough to convince the other user groups that rice was a viable alternative crop.

“Cultivating rice on the upland slopes was definitely an adventure,” said Ri. “The success was completed thanks to the pioneers of upland rice cultivation, and the researchers from MoLEP who supported it technically. Since the first year, everyone has been cultivating rice, and we have become better and better at growing it.”

After the success of upland rice mono-cropping, it was decided to introduce double-cropping methods. An early variety of potato was planted in the second year, immediately followed that same year by a later crop of upland rice.

Seeding times and methods were the same as they were for mono-cropping. After harvesting the early potato around summer solstice, they would level the upland field and transplant young rice plants, putting three or four plants in a cluster, with their roots well watered.





Transplantation directly before or immediately following rainfall is preferred for best success of the plants. Weeding is done before the season of heavy rains, and then, after rooting, 60-90 kg of urea fertilizer is applied per hectare for better rooting and increased yields.

Upland rice transplantation is very labor-intensive, since it needs to be accomplished within 2-3 days around the summer solstice. Harvest times are the same for mono-cropping, but the net food yield is much higher using double-cropping methods.

“The potential to boost productivity is everywhere, and can be easily found if you just know where to look. But I think the highest potential is hidden in technical improvement,” says Ri.

Multi-cropping trials have also been conducted with upland rice and vegetables; even potato, upland rice, and vegetables yielded positive results.

Success was also achieved with Korean pine planted around the rice fields, which matured on average seven years earlier than expected.

Ri is proud of the accomplishments in their work area. “Today, many people visiting our project area cannot conceal their surprise and admiration at the sight of our upland rice. I remember the hard old days, and I feel a deep sense of accomplishment for having protected the forest and getting crops from it at the same time.”

Up-Land Rice in autumn in Jochongol, Suan County of N. Hwanghae province







We Need a Plan

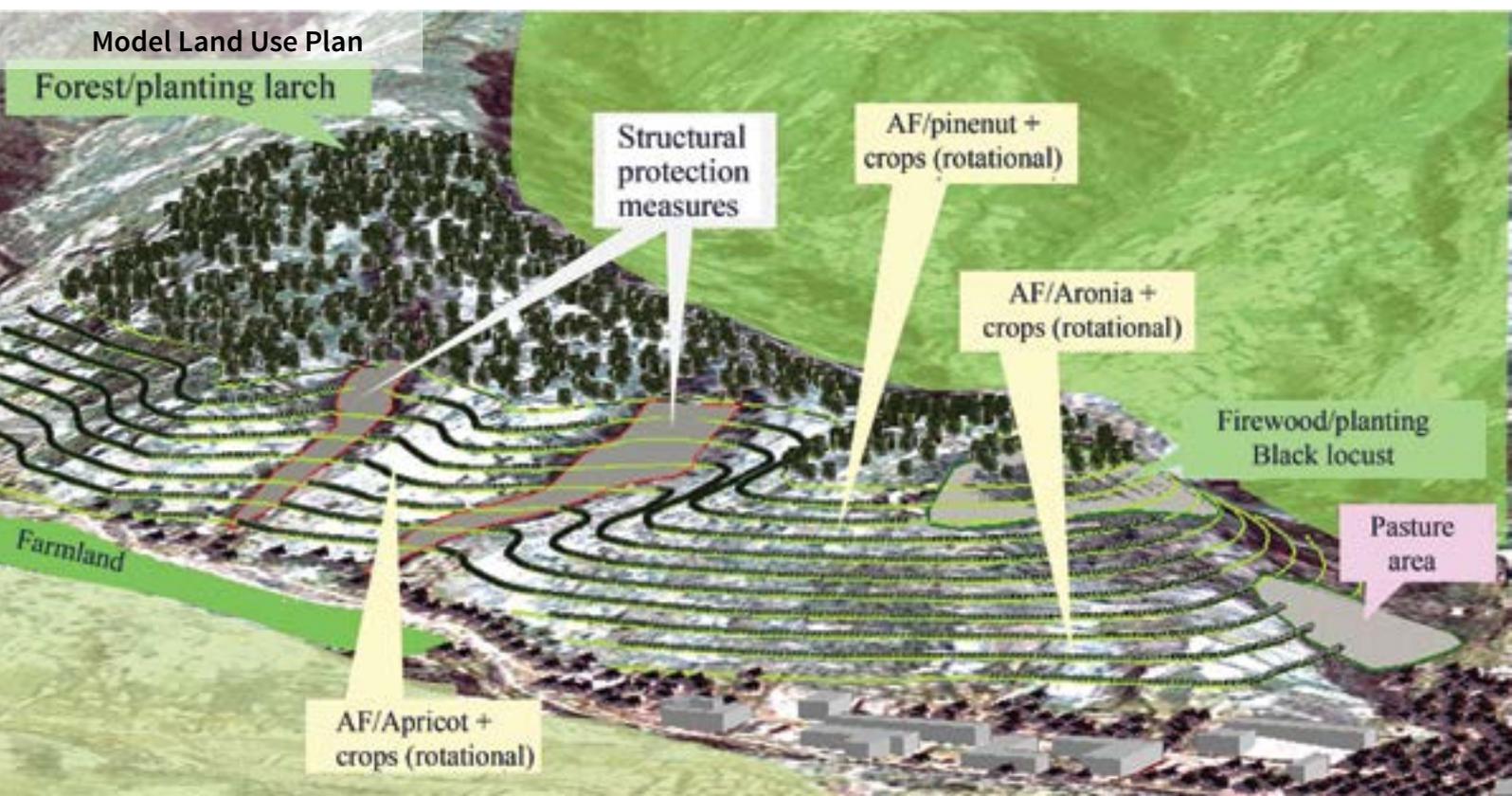
Kim Kyong Ju

Project Management and Consulting Services, MoLEP

The most important part of land management is ensuring that we have a thorough land use plan in place. Perhaps you're wondering why? Because the results of agroforestry depend entirely on how we plan land use and implement it in practice.

Everyone is interested and eager to participate in the planning process, and they contribute many valuable opinions. By working together, we are able to protect the land and boost productivity at the same time. The following excerpts are from various sloping land user group members regarding their personal and professional learning development:

“Last year, we were only concerned about cattle shed construction and the planting of trees in the grass strips. Later, we realized that we had neglected the improvement of oaks and acacias in the forest. Consequently, this year, we will plant 2000 extra trees per ha, making it 10,000 per ha, and we will also grow our own acacia seedlings.” –Group member of SLUG No. 1





“Everyone said that I was a stubborn project participant, that I didn’t care about grass strips and my ditch protection was awful. When I lost all my crops in the end, I was to blame for it. This year, I will make grass strips along the contour and plant aronia trees and orchard grass there. You will not see soil erosion in my area anymore.” –Group member of SLUG No. 6

“This year, we will plant 25,000 acacia trees on 2.5 hectares for firewood. This way we won’t have any more worries about firewood in the future. We are also planning to plant a lot of chestnut trees, from which we expect large profits.” –Group member of SLUG No. 12

It’s great to see people working together and helping each other learn. Of course, one of the most important elements in the land use planning process is discussing the successes and challenges of the preceding year.

In fact, before planting new trees, a forest ranger from Sariwon City visited the project area with the heads of the sloping land user groups, as well as other experienced members and technicians. Taking into account the experiences and results of the past year, they carefully analyzed the condition of the land. Based on their compiled information they created a new plan to fully utilize the land. They singled out areas to protect, areas for firewood and land for agroforestry. They also discussed grass strips (erosion dams), tree planting, re-zoning of cultivation area, plant cultivation, ditch prevention, waterway cleaning, organic fertilizer preparation and all other issues regarding soil protection—all of these issues are discussed in a participatory manner. Additionally, at the annual review meeting, we corrected and/or add new topics to the plan.

In using these careful planning and review techniques for land management, we have seen that the rate of rooting and the growth rate of trees is increasing substantially every year in our project area—and our residents have all greatly benefited from the results.



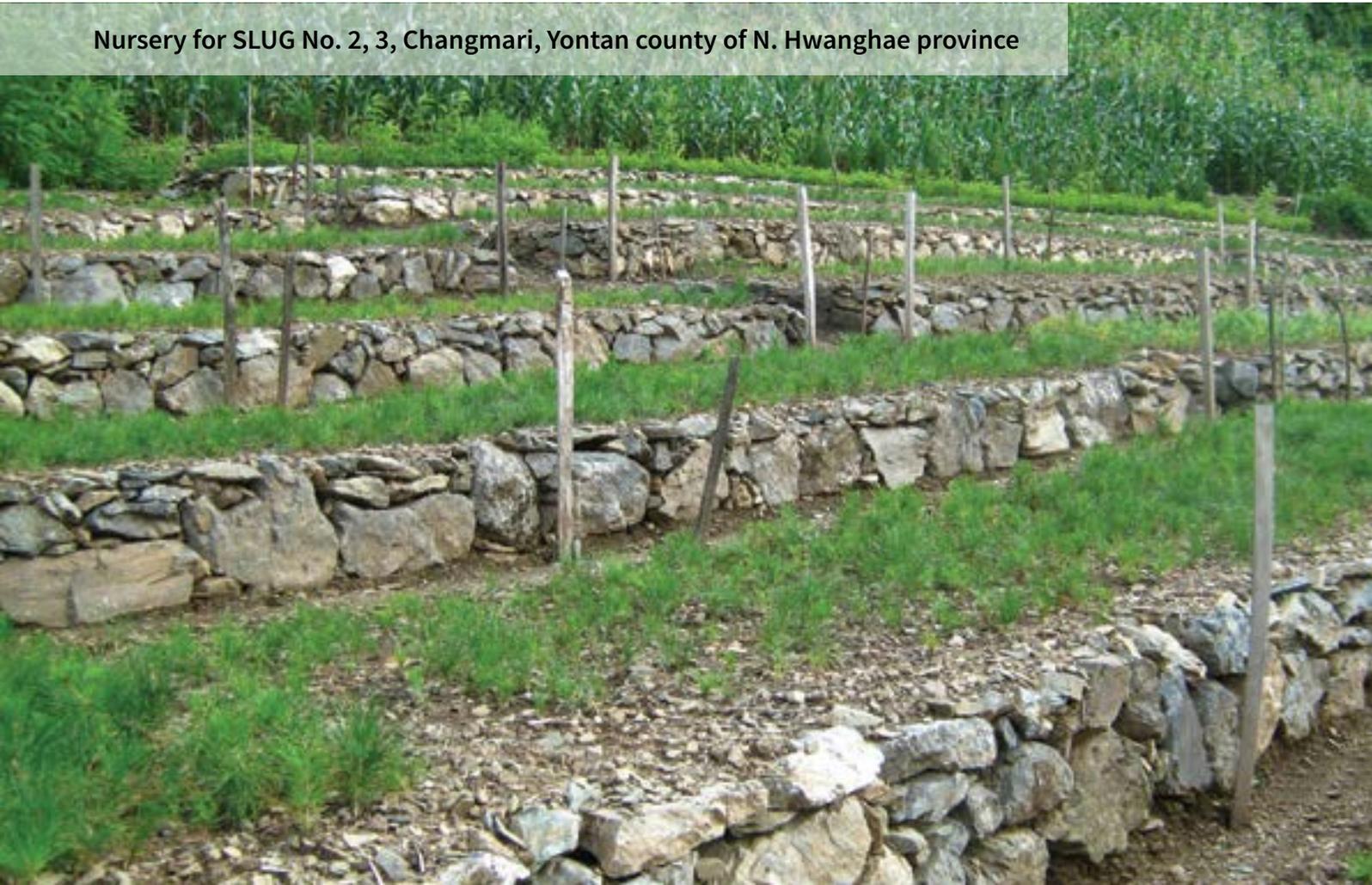
Growing Our Own Seedlings

Im Hak Bin

Forest Ranger, Yonsan County, North Hwanghae Province

In the early stages of agroforestry adoption in Yonthan County, the sloping land user groups received all of their seedlings from a centralized nursery belonging to the forest management group in another part of the country. However, this approach had many drawbacks. Not only did many of the trees arrive to the project sites with roots that had already dried out, but the climates in the centralized nurseries and sloped lands were markedly different from each other, which made it difficult for the young trees to survive. Additionally, while the trees needed for forest management were supplied by a centralized nursery, it often could not provide enough fruit seedlings to meet the needs of the project areas.

Nursery for SLUG No. 2, 3, Changmari, Yontan county of N. Hwanghae province





As a result of these disappointments, it was decided that the trees should be grown on-site, by the sloping land user groups. Even so, finding suitable nursery-land in the project areas, where the average mountain slope was 15°, proved challenging. Working in close cooperation, the land user groups finally designated land in the valleys near the project sites, chosen for their favorable weather conditions, proximity to water resources and relatively high soil fertility. Original seedlings and technical support was provided by the county nursery. Education was given on seed collections, selection, storage, sprouting and many other aspects of seedling production. The County Forest Management Board also provided training on planting of cuttings and roots, grafting, and many other types of vegetative reproductions.

Natural hummus and manure was applied to the chosen seedling fields to improve soil fertility, and the fields were surrounded by hedges to protect the fledgling seedlings from hungry animals and the harshest weather elements.

For tree species needing more technical and delicate care, such as larch, the county provided one-year-old trees so that, after the autumn harvest, the sloping land user groups could transplant these small trees into their seedling fields until the next spring. Only after this adaptation period were the trees ready to be used for agroforestry.

With these changes in place, the cost of transporting the seedlings was removed, and the rate or rooting increased by 90%! Additionally, everyone was able to become knowledgeable about growing seedlings, and—because the nursery was right next to the project area—planting became much easier.

In caring for their own seedlings, the user groups were found attached to the young seedlings, and showed them more care and concern. They also showed a keen sense of pride in operating their own nursery—instead of finding it a burden, they welcomed the new challenge and the ability to be self-sufficient.



Prioritizing Mountaintops

Kim Tang Ok

Sloping Land User Group, Sariwon City, North Hwanghae Province

At first, we weren't really concerned with planting trees at the top of the mountain, but after learning about agroforestry, we could see its importance. We realized that we could *only* prevent drought, soil erosion and landslides caused by floods, if we planted trees at the top of the mountain.

In the past, the people of Sariwon City were more concerned with the most immediate and pressing issues—the state of their food crops and the daily need for firewood—and paid no attention to the condition of the forests. As a result, even light rains could cause landslides, and the productivity of the soil kept decreasing. Further destruction of the forest by human use, as

Participatory ranking for priority species



	생산을	환경보호										
	1	2	3	4	5	6	7	8	9	10	총점	
1. 참나무	5	1	0	5	2	0	4	3	4	4	3	34
2. 소나무	5	1	0	5	0	0	5	3	4	4	3	33
3. 잣나무	5	1	1	5	0	2	4	3	5	5	2	36
4. 가문비나무	3	0	5	5	0	0	3	4	2	3	3	33
5. 연꽃나무	5	3	5	5	0	3	3	3	4	2	3	39
6. 단풍나무	3	1	5	5	0	0	2	2	4	3	3	29
7. 은행나무	2	3	5	5	2	0	2	2	5	2	2	30
8. 느티나무	0	4	0	0	0	0	5	3	5	4	4	25
9. 고사리	5	1	2	3	0	0	2	2	2	2	4	23
10. 고추나무	0	1	0	5	0	0	3	2	4	2	3	24
11. 고추나무	4	1	0	5	5	0	2	4	5	3	4	35
12. 고추나무	0	3	0	0	4	5	3	5	2	5	3	30



well as the visible destruction from natural disasters, made it clear to residents that the forests must be protected, and trees should be replanted at the top of the mountains.

Of all of the available options, the user group in Sariwon City found chestnut trees most interesting. In fact, there already were chestnut seedlings on the mountain in the group's project area. Not only would the trees contribute to reforestation, they could also sell the chestnuts at a profit.

In coordination with the forest management team, the group assigned 0.5 ha of the mountaintop land to each group member. Then, chestnut seedlings were selected and planted at 4-meter intervals. Additionally, a meter of soil was specially re-zoned around each tree, and they were propped up to protect them from wind and rain. Careful attention was given to avoid mischief from animals such as goats and other creatures that might like to eat the trees. Each year after planting, fresh organic manure was re-applied to the seedlings, and weeds were removed.

It wasn't easy to look after all these trees planted in a line. We were always exhausted from caring for fodder and food crops, animals, and the chestnut seedlings growing in the forest protection area. For me, even as a team leader, it was difficult to be a good example for my team members—and the work took a long time before showing results.

Some of the members were quite active at the beginning, but the work got harder and harder. We would remind each other that we were doing this for ourselves, and that this is a demonstration of our patriotism.

Monthly and quarterly evaluations were set, and bonus systems were introduced in the fall, based upon tree growth, grass cutting, manure applications, and other indicators in the forest protection area. Forest rangers would perform the evaluations, giving rewards for the best accomplishments.

Within a few years, chestnut trees covered the whole project area. The residents could obtain a harvest from the trees, feel the pride in what they had accomplished, and then set new goals. It was a tremendous achievement.

The latest set of recommendations for the land user group is to improve the wild chestnut trees into large, high-yielding trees. Additionally, other kinds of higher-value fruit trees have now been planted in the crop protection strips surrounding the fields. These improvements will add real value to both the sustenance of the land and the livelihoods of the group members. Increasing the tangible benefits to group members is a key element in encouraging them to remain active in agroforestry management, as creators and restorers of the forest.

In truth, there is no reason for us to remain behind Suan County's sloping land user groups, or, for that matter, any other county. We are confident of our victory in the competition. Surely this year, we will improve the natural chestnut forest on the mountaintop into superior chestnut forests!



Choosing a Suitable Hedgerow for Sloping Fields

Song Jong Suk

Sloping Land User Group, Yontan County, North Hwanghae Province

Changmae-ri, in Yonthan County, is located in a slate mining area. Densely populated, and having shallow soil depth on the slopes, the harvests from conventional farming on the sloping lands were never very good.

All of that changed when, in 2010, the idea of agroforestry was introduced. We didn't even know what agroforestry was at that time! Moreover, we had no idea that we would benefit this much from the simple introduction of a new plant, the aronia, in our area.

Members of the land user group were taught that they could protect the land, cultivate crops through agroforestry management, and harvest six to eight tons of aronia fruit per hectare every year for more than 20 years if they planted this new crop as a hedgerow around their fields.







Because there already was a high demand for the aronia berry at that time, the members were easily persuaded and they adopted the aronia for hedgerow cropping as a form of agroforestry management.

Already in the very first year of planting, the aronia trees had a much higher survival rate than expected. Planting aronia seedlings was fairly easy, and they could be propagated by both seeds and cuttings. Also, the fact that they didn't have a high demand on soil fertility made them an ideal field hedge plant for the poor soil in Changmae-ri. The aronia plant does not grow very tall, which allowed various crops to be inter-planted in the alleys between fields. The aronia hedges prevent soil erosion, which is helping to restore the degraded soil of the project area.

The first harvest was an exciting time for the new land user group. Experiencing the results of all of their hard work left many unable to even put their joy into words! As time progressed, the user group members became more and more interested in the aronias, and residents demanded more and more of their fruit. The harvest from the first year was sold at a profit, selling the fresh fruit and making it into juice and alcoholic drinks.

The immediate success of the first year encouraged the group members. The more aronias planted, the more profit was gained from the sale of the fruit. Fodder crops were grown between the alleys, given to animals, and then the manure was used to improve soil fertility, which in turn increases the productivity of the crops and aronias. Two-year-old aronia seedlings planted in 2010 are, on average, 0.7-1.4 meters high, and the crown diameter is 0.8-1.0 meters. Annually, most of the trees provide between 300 to 500 g of berries per plant.

Plans are now being made to extend the scope of the agroforestry management project. The goal is to turn the mountain slopes green, full of aronias!



Conservation Agriculture with Trees

Kim Sun Hwa

Sloping Land User Group, Suan County, North Hwanghae Province

The city areas of Suan County are much more densely populated compared to other regions, and so the human demand posed on the surrounding forests is also higher. Additionally, because of severe damage to the forests over time, cultivation of crops had become unsuccessful on the sloping lands.

Therefore we had to employ some unique practices to be successful in this region. In fact, it's not insignificant that some of our first agroforestry activities in conservation agriculture practice concerned the establishment of plant strips. In order to protect the sloping lands, residents from Suan County formed sloping land user groups, and they received technical assistance from the county forest management board to established 1-meter-wide hillside plantings at regular intervals. Orchard grass and alfalfa were planted in these strips, since they could double as animal fodder. Rain-washed hollows were filled with stones and fence-like bushes were established, and on the steep slopes we built parallel terraces bordered by strips of greenery. Consequently, these strategies on the hillsides of Suan County greatly prevented soil erosion.

The second step we took in conservation agriculture practices was that of crop diversification, which proved to be an important land-management tool. When we first started working in the sloping land users group, there were only five or six different crop varieties. With the help of many technicians, as well as our being able to read the many books they provided, we could see that increasing the crop varieties according to the "right crop for the right soil" principle was the best way to protect the land and to cultivate good crops at the same time. As a result, the number of crop varieties had increased to 10-15 in only a few years' time.

Beyond crop diversification, we also learned a lot about crop rotation and double-cropping. We saw immediate benefits of crop rotation, as it helped us to improve soil fertility, control pests, and considerably increase the harvest. After only a couple of years of crop rotations, we successfully established a three-year-rotation system of sweet potato, corn and upland rice, which is appropriate for our area.





The next important step in our journey in conservation agriculture was to constantly improve soil fertility by means of organic fertilizer production, straw cover and other options. This proved to be more difficult to do than we had originally thought.

For example, one of our project sites, Jaechon-gol, lacked proper resources to produce enough organic manure. So, as a minimum solution, we kept the crop residues in the project field. Wheat, barley, corn and other crop straw were chopped and fermented by using microorganism digester. The subsequent fermented chaff was used as fertilizer by being buried directly into the field edges and plow-lines. Stubble and potato leaves were also buried into the soil soon after the harvest. Since we didn't want to limit our potential, we also applied the organic manure produced by the various pigs, goats, and rabbits of our SLU group members, which totaled about 10 Mt of quality manure per household. The results were evident in increased food crop yields in the following years on these sloping lands.

After the successes with food crops, we started planting trees. At the very beginning of our agroforestry management, the yield per *pyeong* (roughly 3.3 m²) of corn was only 700 g and only 600 g for upland rice. However, last year, we reached 1400 g for corn and 1200 g for upland rice. We are happy to report, according to the technical observation results, that the growth rate of Korean pine and larch planted among the strips is 1.5 times faster than in the normal reforestation fields.

Our agroforestry management experiences of the last decade have shown us that we can keep increasing the productivity of sloping lands. In fact, we firmly believe that green forests can once-again thrive if we adopt the practices of conservation agriculture.



From Annual Crops to Perennial Tree Crops

Kim Jong Nyo

Sloping Land User Group, Yonsan County, North Hwanghae Province

Kamsagol is an isolated area in the center of Yonsan County. Here, only a handful of families have settled, relying on the meager crops they could cultivate in the forest for their survival. Over time, the residents of Kamsagol noticed the degradation of the forest, how the erosion of the soil had weakened the trees, and how the crops seemed to suffer more with each passing year.

Concerned, but without any solutions, the residents were amazed when they heard that sloping land user groups in other areas of the country were experiencing fantastic success by applying new methods of land management and intercropping. Excited, the families of Kamsagol met together and decided that they too would like to diversify their forest with peach and chestnut trees, as they heard others had done.

Cultivating bellflower on slopes





Reaching out to a forest ranger, this newly-formed land user group began the slow process of education and land transformation.

Kim Jong Nyo recounts their agroforestry journey: “That first year, we were able to get seedlings, and we planted thousands of them in the valley. Despite the poor soil quality, the trees blossomed, and last year we harvested 250 kg of peaches, and 50 kg of chestnuts from the oldest trees.”

Only one year after the beginning of the project, 1570 m long terraces had been established, and over 1500 trees were planted. Additionally, the top of the mountain was designated as a protected area. Dense populations of Siberian alder and other tree saplings are planned to be grown on the mountaintop to prevent wind damage and soil erosion.

Improving the soil quality in the project area was also a priority the very first year. “We applied manure to our fields right away,” Kim recalls. “In doing so, we easily reached the crop production level of those groups who organized before us. Even though we only formed our group about a year ago, we feel confident that we are among the best of the user groups in DPR Korea!”

Adopting agroforestry is an important strategy for DPR Korea, and the key to turning this land into a powerful and prosperous nation. The land user group members keep this in the forefront of their minds as they continue their work—while striving to keep up with the latest trends in agroforestry management.



It Has Not Been Easy

Won Ye Suk

Sloping Land User Group, Yonsan County, North Hwanghae Province

In Yonsan county, there is a small village that seems to be the very the definition of successful agroforestry. Chestnut, peach, and pear trees cover the hills. The spring season brings a myriad of flowers, while the fall harvests are a time of joy and plenty. Yet, none of this was easy. In the beginning, we did not understand the methods of agroforestry. We ignored the “right tree in the right soil” principle.

Pine nut-based landscape



Building a stone check dam



SLUG nursery management





During the first year, our land user group had plenty of chestnut tree seedlings. We planted them in about 60% of the project area, planting peaches, apricots, pears and plums on the rest of the land. But by the end of that year, at least half of the chestnut trees had died. Chestnuts are meant to be planted in sunny areas, with deep soil, and adequate drainage. Unfortunately, we had not been aware of the importance of proper soil conditions, and had simply planted them in areas that were convenient.

The following year, the team vowed to learn from the previous year's mistakes. We reinforced the sloping land grass strips with rock and deeper soil for better drainage, and replanted chestnut seedlings. Benefitting from the improved drainage and adequate soil depth, the new chestnut trees thrived and began to produce fruit.

Unfortunately, we then faced new challenges. Due to pest problems, much of the fruit of the first year was ruined before ripening, and the productivity of the chestnut trees was quite low. We identified that this was because we weren't implementing proper tree management practices. We learned that effective management was necessary to increase productivity. So, our land user group began to learn the techniques behind pruning, grafting, and proper tree care to prevent pests.

Thankfully, last year, we made a great deal of profit from the fruits! Agroforestry management is extremely profitable when done right.

Our work group has many future plans, including cultivating edible mountain herbs (such as broad bellflower) between the trees planted on the hillside strips. We see the new crops that we can cultivate as a great way for us to learn and improve the land. Truly, the more we learn about agroforestry, the more interesting it becomes!



Livestock: Nurturing Humans and Slopes

Han Ok Hwa

Sloping Land User Group, Sariwon City, North Hwanghae Province

I don't think I'll ever forget the hard times we went through at the beginning of this project.

In 2009, we established a new user group in Sariwon City. Since we had very little idea of what we were doing, the first year was disastrous. Debates and discussions followed the failures, but in the end, there was no better option but to continue. We had to successfully cultivate the degraded sloping land.

Grass strip for fodder



Crowded livestock



Until that point, we didn't fully appreciate the importance of incorporating livestock into agroforestry practices. Now we know that this principle cannot be overstated!

To increase understanding, our group participated in a training session organized by MoLEP's Technical Focus Group members. There, we learned that agroforestry management is more than simply the planting of new trees. We learned that there also needs to be an emphasis on integrated production systems that incorporate crop choice, animal husbandry, soil health, and tree cover. Without these agroforestry management elements, we could not expect to sustainably improve soil and increase crop production. Introducing animal farming on the infertile sloping lands, for instance, could dramatically increase crop productivity and the survival rate of the planted trees.

It was not an easy transition for our land management group. It was difficult to construct the animal stables and shelters when both money and labor for the construction work were hard to come by. We encountered additional setbacks in procuring breeding stock and obtaining sufficient animal fodder. Nonetheless, by helping each other we advanced, step by step.

The county forest management agency helped provide iron, roofing tiles, cement, glass, painting materials, and even labor support, to the great encouragement of the group members.

Within two months, three stable buildings were constructed—with silage reservoirs and a groundwater supply system—to house pigs, goats, rabbits, chickens, and ducks. We also obtained breeding pigs and ducks, as well as basic fodder for the first year.



We added goats that were fed fodder plants from the grass strip project areas. Goat milk is then used as an additive in the feed for the pigs, chickens, rabbits, and ducks.

Within the first year of procuring livestock, our user group had eight pigs, more than 100 chickens and rabbits, and 30 ducks. We were able to sell some of the excess animals, and use the income to purchase fertilizers. I remember that it was so hard that first year, but we are very proud of ourselves.

During that first year, we also applied more than eight tons of animal manure to the sloping land. We saw the corn harvest more than double and the survival rate of planted trees increase from 20% to 80%. We also saw improvement in *Dactylis glomerata* and other fodder plants and trees along the plant strips.

It became clear to all of us that agroforestry management was dramatically elevating the living standards of the user group. The agroforestry of tomorrow is already in sight: trees full of ripe chestnuts, peaches, plums, and apricots. Corn fields with big ears of corn, and valleys covered with flocks of goats and ducks. We want to spread the word to everyone interested in agroforestry management that livestock is the most important component!



Fresh Fish from Slopes

Han Yong Ok

Sloping Land User Group, Yontan County, North Hwanghae Province

If I said we breed fish on the sloping land, how many people would believe me? Not many, since fish farms aren't typically found in the mountain areas. Yet this is exactly what we have done.

It all started during a field training of the sloping land management project, when our user group spent time exploring water drawing facilities for preventing damage during droughts and floods.

That's when we had a revelation. What if we "killed two birds with one stone" by setting up a reservoir close to the nursery to catch rainwater, and also use it as a fish farm? Nutritious fodder plants from the grass strips could be used as fish food, and the fish themselves could become an additional source of income. The idea was brilliant!

Water harvest pond





Nearby the nursery, there already was a pond once used for fishing, but it had been destroyed in floods. People who remembered fishing there remarked that it had been quite good, which confirmed that there would probably be a sufficient natural water supply to maintain our new reservoir. We decided to construct a new water reservoir for the nursery. We removed the earth and sand from the site, and re-banked around it.

The county forest management board was very supportive of this new project, and, after completion of the new fish pond, they provided 3000 small fish from the county fish breeding center, which were released into the new pond.

However, our efforts were not to be without challenges. During the first heavy rains of the season, sand flowed back into the pond, killing all the fish. Not wanting to give up, our group members corrected the design of their fish pond, removed the sand from the pond floor, laid a separate waterway to divert future flood waters, and netted the drainage to keep the small fish inside. During the repairs, 20 living fish were discovered in the pond. Having thought they had all been killed, this aroused quite a bit of excitement within our group. The fish were measured, and we found that they weighed more than 400 g on average, with some weighing over 600 g!

This finding meant that if 3000 fish were raised each year, our group could produce more than a ton of fresh fish. This amount of fish, if shared equally between the 10 families in the user group, could provide substantial improvement in the diets and livelihoods of the group members.



Excited by the prospects ahead, the group members continued to improve their new fish pond. Along the rim of the pond we planted willow trees and water oat. Curly pondweed and snapdragon were also planted and reproduced. Everything was provided for the success of the new venture and the care of the fish: feedstuff, resting spaces, egg laying corners and hiding habitat areas.

Witnessing the success of this project, other village residents also became interested in fish farming. They feed their own fish now, and bring small fish back to repopulate the pond.

In the coming years, the SLU group members plan to make full use of the water basin as a fish farming opportunity. This will allow them to improve their income and enjoy the benefit of fresh fish grown on the slopes. It is also our hope to utilize the nutrient-rich water from the pond to fertilize our nursery and nearby crops.



People Can Change, and So Can Slopes!

Ri Sung Nam

Forest Ranger, Sariwon City, North Hwanghae Province

A few years ago, some people from Sariwon City visited the sloping land user group in Suan County. They had made the pilgrimage to see for themselves the mass transformation that was occurring on the slopes due to the proper application of agroforestry management.

“It was just as we had been told,” recalled Ri Sung Nam. “Grass strips on the sloping lands and upland rice, sweet potato, corn, and much more growing in between.”

User groups share their experiences





Coincidentally, their visit occurred at the same time as that of some foreign delegates who were also visiting the area. The residents from Sariwon watched, as the head of the Suan County user group talked casually with the foreigners, telling them about their experiences in agroforestry management. Knowing that only a few years before, this woman had been a housewife who only farmed her own garden, the Sariwon City visitors were impressed by the positive changes that had come to the Suan County user group members.

Shortly after their visit, the residents of Sariwon City formed their own sloping land user group. They worked hard to improve the forests in their area and to raise the standard of living for their members. Since then, the initial user group had multiplied, so more residents in the area can participate in agroforestry management.

The SLU Group No. 1 constructed an integrated stable of 40 m² for pigs, goats, chickens, rabbits, and other animals, following the principles of a robust forestry, agriculture, and livestock production system.

At the same time, the SLU Group No. 6 set up a nursery field, and provided all of the SLU groups in the area with over 200,000 tree seedlings of superior variety. This nursery provided SLU Group No. 6 with additional income, which changed not only their livelihoods, but also the very way that they think about their environment.



“Last autumn, I was climbing the mountains, as I often do, and I heard the shrieking of many people,” said Ri. “They were yelling at me to stop the man descending the mountain! A middle-aged man holding a scythe in his hand, was running down the mountain towards me. He had climbed the mountain with his scythe, intending to collect some wood for his fence, and was now running for his life. The man was being chased by the group members, who were now hurling accusations at him, including: ‘What are you doing here with a scythe? Don’t you understand that we grow each and every tree here? You are heartless!’ Their allegations were like machine gun fire. As a forest ranger, I did not even have a moment to talk. Stunned by the passionate response of the women, the ‘invader’ begged a thousand pardons and assured he would never do this again. He barely escaped.”

Ordinary housewives and women have become competent agricultural producers and forest managers, who are now the pioneers of agroforestry. In fact, these women protect the sloping lands, they plant trees and crops, and they reverse the damage done in previous years. Through their efforts, they who are keeping **Kim Jong Il** patriotism in their minds contribute not only to the health and beauty of the forests and their hometowns, but also the improvement of many people’s lives.

Thanks to the creative efforts of all of the group members, the forests of Songsan Ri are turning greener and greener every year.





Journey of Learning: Our Field School

Choe Kwang Il

Technical Expert Research Institute of Economic Forestry, Academy of Forest Sciences

Yonsan County, as its name implies in the Korean language, is a rugged and mountainous area. Because it has so little arable land, the protection of its forests was a difficult task.

In the year 2000, discussion started about the protection and restoration of the forests with agroforestry management. While county officials immediately accepted the idea, the local residents were staunchly opposed. Unfortunately, at that time, they did not understand how improving their local environment would help improve their lives.

Seeing as further education was imperative, it was planned to form two sloping land user groups in the center of the county to test the agroforestry management principles and, once proven successful, to expand coverage to the entire area. Kamsgol and Majongol were chosen as the initial sites, and instruction rooms were planned for further education in those areas.

Blueprints were finalized and the construction of the new buildings was completed. Due to the hard work and support from the county forest management board and the user group members, construction could be completed before the rainy season.

The instruction rooms brought immediate and innumerable benefits. First of all, the staff and county forest management teams now had a place to meet with group members and together they could discuss scientific and technical problems. Trainings could be conducted, and information easily disseminated.

Visitors from Yonsan county and other regions of the country made field trips to the centers to learn about agroforestry. They were able to peruse visual aids and reference materials, gaining valuable knowledge about agroforestry development. Many even envied the facilities, as they saw how beneficial and important having such a space was for the training of agroforestry managers.



In the years following the construction of the training rooms, there have been 87 lectures and trainings about agroforestry management, as well as tree-specific management techniques. Additionally, 13 seminars have been held, with demonstrations on provincial level, and five international sessions about sustainable forest management were completed by foreign experts.

It is now well known in Yonsan County that agroforestry management is an option for sustainable forest management, reversing deforestation, increasing food security, raising the income of the local residents, and preventing natural disasters. This has become the daily work of the SLU groups.

Further plans have been made to equip the instruction rooms with more technical publications, posters, computers, projectors, and other modern training facilities, and to use them for national and international learning exchange purposes.



Co-learning from the County Working Group

Choe Hyok Chol

Technical Expert Research Institute of Economic Forestry, Academy of Forest Sciences

Sinphyeong County in North Hwanghae Province joined the project for sloping land management in 2013. As this county had a larger forest area than other counties, it was necessary for the SLM group to have larger project areas than other SLM regions.

The implementation of the project fell to the county working group. This group consists of four people: the director of the county forest management board, the director of the sub-office of the regional forest management, a project forest ranger, and a member of the central working

Learning and planning together at County level





group. The task of the county working group was to select the right project areas, set examples of agroforestry management, and see that it was replicated effectively across the county.

Since Sinphyong County had only recently introduced agroforestry management—and previously had very little understanding of sloping land management—the county working group began by educating the staff of the county forest management team, giving them a crash course in SLM principles. Using this foundational knowledge, the working group formulated an annual work plan, and organized 10 SLM user groups in the area around the mining villages. Exchange visits were also arranged for the new group members to see successful project areas in Suan and Yonsan counties. Based on the information gained from the exchange visits and the analysis of local soil usage, the group developed their own strategies for agroforestry management.

As soon as the snow melted, the SLM user group members began the work of soil protection. As was done in other counties, the group members established grass strips on the contoured parts of the terraces. They created stone terraces, filled up flood-washed ditches and planted tree seedlings. Every 10 days, the county working group would review its activities to ensure it was still on track and that the plan was properly promoted in the community.

After the seeding and sprouting had begun, members of the county working group and leaders of the sloping land user groups would monitor the progress and perform evaluations of each group's project area. They would give feedback on the grading for land use planning, soil protection, tree planting and survival rate, grass seeding, crop diversification, and organic fertilizer application. Reviewing the criticism helped all involved to understand how each site was progressing towards the strategic goals of the project.



The county's involvement—in hosting on-the-job training, reviewing every 10 days, and ensuring that all participants understood both their own task as well as that of each area—also unified the user groups, strengthening their sense of responsibility and ownership in the project. Now, user group members are preparing to grow their own seedlings from their own nursery.

There remain many more issues that still need to be addressed, but learning from more advanced projects (such as in Suan and Yonsan counties), the Sinphyong County working group is confident that they, too, can fully develop the local sloping land management program in their area.





Creating a Pilot Project for the Country to See

Pak Kon Gyu

Central Forest Design Technical Institute, MoLEP

In the center of Suan County lies a large mining village. Dense population and many years of over-cultivation of the mountain slopes had decreased the soil quality, leaving behind vast areas of degraded forest land.

The Central Working Group for Agroforestry Management saw the need to create a special agroforestry management pilot unit that could be easily replicated to other areas of the country. The poor condition of the sloping land, a readily-available labor base, and the proximity for the central working group to supervise the project, made this an ideal location to begin a pilot restoration project.

Education was the first step of the process. To begin, an overview of agroforestry management was given, and then sloping land user groups were created for its practical application. Forest rangers and user group members were taught advanced technologies, seedling production, and how to make a work plan for the sloping land.

The tops of the mountains were designated as forest areas. Lower elevation hillsides, parallel to the contour lines, were set aside to cultivate grass strips, shrubs, and other plants at 8-12 meter intervals to prevent soil erosion. Grass strips were 20-40 cm wide, and raised with soil. This strategy greatly reduced the soil erosion and, as a result, a considerable increase in tree survival and growth was observed. At the foot of the mountains, corn was cultivated with space reserved in the middle for fields of upland rice. This is often triple-cropped with early potato or sweet potato.

A great many trees have been planted in the project area, including chestnut, pine nut, larch, aronia, and others. The crops have also been diversified with legumes, groundnuts, and many other edible and medicinal herbs.

Any mistakes made in soil protection, grass strip building, crop choices, etc. could easily be monitored and corrected by the supervision of the central working group.





Thankfully, the success of the project was evident from the very first year. Now that the superiority of agroforestry was clearly demonstrated, it was decided that it should be replicated in many regions of the country. To achieve this goal, the officers of the various forest management teams were encouraged to visit the pilot area to see firsthand the experiences and successes of the sloping land management user group. These visitors were informed of the results of the scientific evaluations, and convinced of the superior method of creating ecological mutuality between crops and trees. This on-site demonstration had a profound effect on the visiting forest managers. Their surprise was evident as they listened attentively to the sloping land user group members sharing their experiences. After that time, more and more groups have been formed, and agroforestry management has been adopted in many cities and counties throughout DPR Korea.

Now, arranging exchange visits is still a high priority for the central working group. Promoting further teaching and cooperative group learning experiences has proven to be an effective method of advancing agroforestry management. These exchange visits are also an opportunity to generate creative initiatives from a broader perspective.

In November 2012, a national demonstration was held for the sloping land user group of Suan County, to recognize them for their efforts in pioneering agroforestry management. Nothing is impossible if we strengthen the role of the forest rangers, and galvanize the masses



into action. It has been concluded that motivating the public towards development of agroforestry is key to combating deforestation and transforming our mountains and forests into golden treasures. Pilot units and exchange visits have been a crucial part of this transformation, as well as making concerted efforts to learn and disseminate new scientific techniques.

We will surely repay the keen consideration and trust of the Respected Marshal **Kim Jong Un** with our success in agroforestry management.





Multi-Disciplinary Working Group

Kim Kwang Ju

Project Management and Consulting Services, MoLEP

For the successful fulfillment of the SLM Project, we had to realize that mountains represent both challenges and opportunities. We understood that there are still many things that we do not know about trees, land, and water. With this in mind, MoLEP has been working since 2007 to create an effective multi-disciplinary working group that could overcome these challenges and embrace new opportunities. Overall, this group was designed to monitor and modify the sustainable soil practices for the continuation of agroforestry management on the sloping lands.

The multi-disciplinary group was assigned the task of preparing for the first national workshop (29-31 July 2008) on agroforestry management. Since then, there have been three additional national-level workshops organized by this team. It also accelerated its mission through the publishing of the book, *Agroforestry Management Techniques*, which was used to promote the understanding of agroforestry management for land managers and the scientific community.

Multidisciplinary Working Group's activity





During the initial workshop, it was clearly communicated that agroforestry management is an essential requirement for ecological sustainability and the improvement of people's lives. Presentations and discussions centered on the necessity of agroforestry principles, the integrated use of the mountains, key tree species that are of high economic value, and global trends in agroforestry. The need for pilot units to be replicated in more locations was also stressed.

Multi-disciplinary discussions for agroforestry development have reviewed successes, experiences and lessons learned. The national workshop was only a public awareness raising activity. It became apparent that agroforestry management is definitely a new academic field during the preparation of the 2nd national workshop. Being confident of the possibility to improve people's living standard in the shortest time by means of agroforestry management, a great number of scientists, technicians and officials joined with keen interest.

The 2nd national workshop (19-20 October 2009) brightened the attendants' experts' eyes, suggested practical solutions and encouraged them all to partake in large-scale instruction and dissemination of agroforestry management and its implementation. We attain ever more success from agroforestry development. Now, 8 countries have introduced this agroforestry system and SLM is also reflected in the projects carried out by EUPS units 4 and 2.

The 3rd national workshop called for even stronger attention of all participants. They recognized the necessity of a policy on agroforestry and foreign guests expressed their readiness to promote active international cooperation. Key issues for discussion in the 4th national workshop (6 August 2013) were the national agroforestry strategy development. MoLEP also proposed a project for national strategy and an action plan, and the international organizations expressed their intention to support it.

MoLEP continues to strengthen the role of the multi-disciplinary working groups for the better project implementation of agroforestry development. Organization of the national workshops also continues to be developed and improved.



Go on a Pilgrimage

Kim Yun Chol

N. Hwanghae Province Forest Design Institute

One of the keys to the positive and successful implementation of sloping land management projects has been the active learning from those with experience in the techniques of agroforestry management, and adopting and implementing those same techniques in our own projects. In some cases, this meant having experts come to DPR Korea. In other situations, it meant we would need to go to other lands to learn from others.

With this in mind, Yunnan Province in China is a perfect area for researchers from DPR Korea to visit. Nearly 94% of the area is mountainous and it is home to the East and Central Asia Regional Office of the World Agroforestry Centre (ICRAF), which conducts many projects in the area.

Workshop on training of trainers in Kunming, China





Consequently, we put together a research trip plan that included a visit to Yunnan, the main objectives of which were to learn about the achievements and experiences from sloping land management projects in other parts of the world, and adopting them to the realities of North Hwanghae Province.

ICRAF's agroforestry inter-cropping objectives centered on the use of high value crops, such as potato, rape, and hemp. For use in their agroforestry management projects, the ICRAF offices are located near a large potato tissue culture lab (owned by the Chinese Academy of Agricultural Sciences), which produces high-quality potato seeds with good yields, such as the triploid hybrid variety.

Another important field trip visit included stopping at The Gene Bank at the Kunming Botanical Garden, which is operated by the Chinese Academy of Sciences. There, our researchers from the DPR Korea were introduced to technologies that can preserve botanic gene resources for up to 2000 years. The visitors were all impressed at The Gene Bank's more than 20,000 different species of plant seeds.

Examples of agroforestry management on relatively flat areas of the Himalayan highlands were also very impressive. For instance, researchers visited project sites that included a field



surrounded by a windbreak of wild walnut and Korean poplar trees. Fruit trees had been planted in this field, including peach, walnut, banana, and many other varieties, interspersed with vegetable crops. Though the total field space was small, we saw it was quite diversified, which allowed harvest to continue in every season of the year.

On the sloping lands, terraced fields had been laid, with grass strips to prevent soil erosion. Different species of trees had been planted, such as tea and plum, and upland rice, barley, wheat, and other crops were cultivated. On the terraces of tea trees, dogwood was planted at 20-30 m intervals, which helped improve soil quality.

A visit was also conducted to Haobao Farm, a large organic vegetable farm in Yunnan. It was exceptional in that this farm applies no chemical fertilizer for its vegetable production, and still produces acceptable yields.

Students at the Faculty of Forest Program at the Forest Sciences College in Yunnan spend the first two years learning the basics of agroforestry. During the third year, they integrate lectures and practical application of agroforestry, training experts in combining the forests with vegetables, crops, and medicinal herbs. This curriculum has become a reference in the development of a curriculum in agroforestry.

The study tour provided the DPR Korea's research team with the opportunity of academic exchanges and discussions with their peers, and proved to be an important turning point in their research activities. Furthermore, this pilgrimage of sorts helped to establish the academic framework for agroforestry management and ensuing strategies. To this end, these opportunities have been invaluable in the development of the sloping land management projects in Suan County.





We Have Our Own Curriculum

Song Ki Ung
Kye UngSang Agricultural College, Kim Il Sung University

The main task of educators in the Songun area is to educate qualified and competent people who have the ability to reliably shoulder the development of a powerful nation.

As agroforestry became widely introduced and adopted as a national strategy, it has become increasingly important to extend it to the colleges as well. Consequently, it has now become educational standard practice to integrate agroforestry techniques in the university curriculum.

In fact, after the 2nd National Workshop on Agroforestry in 2008, in cooperation with ICRAF, **Kim Il Sung** University introduced lectures on agroforestry into the subjects of the Department of Land Protection and the Department of Forest Sciences. Additionally, lectures have been complemented with practical applications.

Lecture subjects include the following: the concepts and basic principles of agroforestry management, the history and trends of agroforestry development, ecological basics and models, proper selection and investigation of the area, soil management methods, and key techniques of agroforestry management. Application topics are given in the selection of the right sloping land project sites, measurement of contour and gradient, formulation of a land use plan, prevention of soil erosion, tree and crop distribution according to land categories, pest differentiation and management, establishment of tree nurseries, water impounding, and other matters.

Hundreds of students are now participating in studying the practice of agroforestry management. Scientific and technical achievements and experiences from the sloping land projects in North Hwanghae Province are used as a reference for research that is conducted on, among others, the establishment of grass strips for the prevention of soil erosion, soil management and fertility improvement methods, formulation of land use plans, and crop and tree selection according to their natural environment. Success from all of these research topics is incorporated into the revised curriculum.

Much research has been done on the project of sloping land management in North Hwanghae Province. The publishing of the *Agroforestry Management* textbook has contributed



significantly to the furtherance of the project. Agroforestry study tours and technical trainings, arranged in collaboration with the SDC and ICRAF, have further enhanced the development of professional understanding. Survey equipment, computers, projectors, soil analyzers, and many other instruments have been widely utilized for the education and scientific research of the students.

Education and technical training of personnel, for the advancement of agroforestry management in the sloping land management projects, remains an integral part of advancing the success of future agroforestry management within our country.



Green Mountain becomes Gold Mountain

Kim Kwon Mu

Research Institute of Forest of Economic Value, Academy of Forest Sciences

In the plenary meeting of the Central Committee of the WPK in December 1959, the great leader **Kim Il Sung** suggested forming forests of economic value, and said, in doing so, fruit trees should be planted unlike other general forests.

For decades, in order to accomplish his goals, we have recorded trees of high economic value (Korean pine, chestnut, walnut, aronias and *Xanthoceras sobifolias*) and have taken actions to multiply them widely.





The successes we achieved in the process of doing so became the basis of the movement to turn the mountains green with agroforestry management.

Research stations of our institute have been selected as an implementation partner of the SLM project. Since then, based on our research success on the forest of economic value, we could easily and quickly define a rational agroforestry model with Korean pine, chestnut and other tree species of economic value. These have been introduced and generalized in many SLU groups in Suan County and other counties in North Hwanghae Province.

Together with the researchers, the SLU groups in practice of agroforestry management have been able to create various conditional models using scientific methods.

Models developed at the moment are 500 chestnut trees per ha (5x4 m) for the chestnut agroforestry system, 1250 Korean pine trees per ha [15x(2x2)] for the Korean pine agroforestry system, 400 evodias per ha (6x4 m) for the evodia agroforestry system. For seabuckthorn, 5x2 m for alley cropping and 2-3 m for belt-shape cropping with 5-7 m of width for each alley. Additionally, 1000 aronia per ha are used either to form the alley or a belt shape.

Agroforestry models according to different tree species have considered the principle of “the right tree on the right soil” and the requirement of profitability. Research successes on each location have solved the problem of providing superior tree species of high economic value.

At present, agroforestry management is an important political issue. We will explore advanced techniques of multiplication, acclimatization and cultivation for further extension of agroforestry management and development while breeding new and superior tree species of high economic value, and actively explore and store gene resources. Ultimately, our slopes will give us food, clothing and anything else we need. A real ‘golden mountain’ that will show the vivid superiority of agroforestry management.



Evaluation Drives Progress

Kye Un Hui
Project Management and Consulting Services, MoLEP

In the implementation of each and every project, thoughtful evaluation is a necessary element. Careful evaluation reveals whether the project is being properly carried out according to its underlying strategies. It confirms whether intermediate and final goals are attainable, and whether project sustainability can be ensured.

When it comes to the sloping lands management projects, especially in severely degraded sites, the long-term effects of the project are not immediately visible. Evaluative activities therefore knew many obstacles—especially when evaluating goals that dealt with future ecological, economic and social improvements. As a response, it was decided to set realistic annual goals according to the project plan, so that evaluations were meaningful to user group members.

Participatory monitoring and evaluation





The evaluations were carried out with the participation of the sloping land user groups heads and others, such as forest rangers and designers who work closely with the projects. Evaluations were conducted seasonally, every six months, and each year. As a strategy to inspire its user group leaders, the national project working group encouraged exchange visits between the groups, allowing them to learn from each other. It also took measures to ensure the effectiveness and objectivity of the evaluations, and to create an incentive (bonus system) for well-executed land management.

The evaluation of the project areas is a powerful system, driving the sloping land user group activities forward. The evaluation is objective and fair, and encourages user group members to become more active and creative. As a consequence, the ecological condition of the project areas has improved substantially, as has the livelihood of the residents. The annual evaluation works effectively as quality control and as a motivating force, pushing towards the goal of progressive agroforestry management.





Editor's Note

Improving people's living standard is the driving principle of our government of the DPRK. Respected Marshal **Kim Jong Un** has repeatedly indicated the need to rehabilitate degraded forest land with agroforestry management, improving the living conditions of the people, and solving food security problems.

Consequently, the adoption of agroforestry management principles in the sloping lands is the most realistic plan to solve the problems of insufficient cropland, to prevent degradation of the land and to ensure the sustainable production of crops and trees in our country. It has ecological, economic and social benefits, as it helps to protect the diversity of plant and animal life in our ecosystem.

In our country, agroforestry management is the future of land use, and practical models contribute greatly to the lives of their residents. With the support of the Swiss Agency for Development and Cooperation (SDC) and the World Agroforestry Centre (ICRAF) in China, we have been able to introduce and disseminate agroforestry widely across DPR Korea, and its practices have now become commonplace.

In the past 10 years, our people have learned practical skills and increased awareness about agroforestry. New methods have been developed, and experiences shared. Strategic, legal and organizational means to develop and extend agroforestry have been put in place, and scientific research has advanced continually.

MoLEP has a great appreciation for the SDC and ICRAF organizations, who have tirelessly helped us carry out sloping land management projects in DPR Korea. We are also thankful for the great efforts of the central working group and cross-disciplinary working group.

We plan to continue developing the project of agroforestry management, ensuring the success of revitalizing the sloping lands, and extending the project to a larger scale in all areas of land use. In doing so, we will clearly demonstrate the socio-economic and environmental impact of agroforestry management, accumulating knowledge and strengthening international cooperation, and extending our contribution to the international practice of agroforestry.

The agroforestry management project fully conforms to the requirements of the Millennium Development Goals (MDG), the Climate Change Framework Convention, the REDD Plan, the Biodiversity Convention, and in particular, the UN Convention on Deforestation Prevention.



In the process of developing agroforestry management within our country, our efforts will not be limited to our own lands, but expanded to an international level. We believe that our actions on behalf of agroforestry management will be of benefit everywhere, and we hope that our efforts will bear good fruit.





Ministry of Land and
Environmental Protection (MoLEP)
DPR Korea



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
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**World
Agroforestry
Centre**

Ten Years of Sloping Land Management

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