Newsletter

# AgFor SULAWESI

Agroforestry and Forestry

## SUCCESS STORY COLLECTION

Newsletter
AgFor
SULAWESI

compact disc case

## EDITORIAL

**Translator:**
Irfan Kortschak
Amy Lumban Gaol

**Editor:**
Robert F. Finlayson

**Design and layout:**
Tri Yudianto
Amy Lumban Gaol

**Further information:**
Amy Lumban Gaol
Communications Coordinator
a.gaol@cgiar.org

**Visit our website:**
www.worldagroforestry.org/agforsulawesi

AgFor SULAWESI
Agroforestry and Forestry

# NEWSLETTER SPECIAL EDITION

## SUCCESS STORY COLLECTION

November 2016


# About AgFor

The Agroforestry and Forestry in Sulawesi: Linking Knowledge with Action (AgFor) project a five-year project, funded by the Global Affairs Canada, that aims to improve equitable and sustainable agroforestry and forestry-based livelihoods' systems for rural communities in Sulawesi. Led by the World Agroforestry Centre (ICRAF), this project is implemented in South and Southeast Sulawesi and Gorontalo, with focus on three interlinked components: livelihood, environment and governance.

# Preface

The Agroforestry and Forestry in Sulawesi: Linking Knowledge with Action (AgFor) project was initiated in 2011 with the support of the Government of Canada, acting Global Affairs Canada (GAC), formerly the Canadian International Development Agency (CIDA). AgFor improves equitable and sustainable agroforestry and forestry-based livelihoods' systems for rural communities in Sulawesi. Over the last six years the project has worked with multiple community, private sector, and government partners in 10 districts of South Sulawesi, Southeast Sulawesi and Gorontalo. This extremely successful project will close in March 2017.

This final edition of the AgFor newsletter features success stories from across all AgFor locations; prepared by the AgFor team, farmer partners, government officers, and citizen journalists.

Stories from **South Sulawesi** discuss how the production and use of organic fertilizer has improved farmers' income; and the role of knowledge and information sharing in strengthening local capacity, accelerating district development, and improving the incomes and lives of AgFor farmer partners.

**Southeast Sulawesi** contributions examine how agroforestry has greened villages, the interesting agroforestry spirit that links South Sulawesi to Aceh, and the transformation of agricultural garbage into money for AgFor communities. Other stories describe marketing support that has expanded market opportunities for forest honey collectors while also improving sustainable forest management; and the role of tree commodity crops in achieving successful community-government collaborative management of forests that enhance sustainability.

From **Gorontalo**, articles detail how composting facilities initiated by AgFor have gained support from government agencies and other local stakeholders. Other stories appraise AgFor's positive contribution to conserving nature reserves and controlling soil erosion through natural vegetative strips, which also enhance agroforestry systems; as well as, the development of partnerships between local nurseries and commercial plant sale outlets.

As this stories convey, the AgFor project has positively impacted lives and the environment across Sulawesi. Over 630,000 people have improved income as a result of adopting agroforestry technologies promoted by AgFor; and almost 740,000 ha of agroforestry, agriculture and forest systems are under improved sustainable management.

Good news!! Although the project is ending, positive impacts will continue. Partners and the AgFor team have developed *exit strategies* that maintain some activities to ensure the sustainability of impacts. Key partners – from community members to government agencies – endorse and support the exit strategies. ■

Happy reading!
**James M. Roshetko**

AgFor Sulawesi project senior team leader

# TABLE OF CONTENTS



# Success Stories from South Sulawesi

# AgFor's role in the development of the district of Bantaeng

*Authors: Christine Mailoa and Amy Lumban Gaol*

The AgFor team first commenced work in South Sulawesi five years ago, in 2012. Since then, its positive impacts have become increasingly apparent. In the district of Bantaeng, AgFor's positive effects have been experienced not only by farmers and other members of the broader community but also by a number of others, including government agencies and administrative bodies.

At a meeting on 29 August 2016, at Pantai Marina, the District Head of Bantaeng, Prof Dr Nurdin Abdullah, shared his thoughts about the AgFor project and its impact. He said that since first taking office he had faced a number of significant challenges in the implementation of his duties, with his responsibilities requiring him to engage in much preparation and study. One of these challenges related to the unresolved issue of flooding, which routinely affects communities in Bantaeng, with floods occurring almost every year.

The District Government conducted a number of initiatives to manage the impact of floods, such as constructing check dams for farmers, promulgating new areas of protected forest and other measures to ensure the optimal use of natural resources to prevent environmental damage.

'Despite all our best efforts', he said, 'I was aware that for any of these initiatives to be effective, they needed to be accompanied by measures to improve our human resources. Another significant constraint was the lack of broader community understanding of the importance of the government's initiatives. Thus, for the initiatives to be successful, it was vitally important to change the paradigm, to change the way the community thought, particularly farmers'.

As an integral part of its mission, the AgFor team conducted a number of training activities for farmers and other community members to help them develop an understanding of the importance of environmental preservation and the sustainable use of natural resources.

For Abdullah, one of the most important indicators of the success of AgFor's training was the degree to which they had facilitated changes in level of understanding and behaviour of the community.

'The training and capacity-building activities conducted by AgFor for members of the community at the village level have had a significant positive impact in terms of improving community welfare', he said.

He further acknowledged that these activities have helped facilitate the ability of the district government to fulfil its mandate to develop the economy and to preserve the environment in Bantaeng.

The head of the district's Planning Agency *(Bappeda),* Prof Dr Syamsu Alam, agreed that the program has had a significant positive effect. At the same meeting, he said that AgFor had enabled the district to successfully address issues that had remained unresolved for years, adding that he wished the program could continue to provide assistance in the future. He stated that AgFor had had a significant impact not just in

terms of raising awareness and increasing the level of knowledge of farmers and members of the broader community but that it had also provided direct assistance to others.

'AgFor has played an extremely positive role in providing effective assistance, particularly in terms of programs and activities to develop the capacities, and to expand the knowledge, of a wide range of people," he said.

He further stated that the development of the district's human resources was extremely important, with capacity building being required not only at the community level but also for staff in government agencies and leaders and managers in villages.

'One significant achievement of the AgFor team relates to their role in formulating district-level regulations related to the imposition of charges for water services', he added.

Other AgFor activities that have played a significant positive role in the development of Bantaeng include training in the cultivation and planting of seedlings, production of organic compost and fertilizers, and the marketing of seedlings for sale.

'The AgFor team has also conducted a number of knowledge-sharing activities' he said, 'including research conducted on demonstration plots and facilitating comparative study tours to other areas that have achieved success through the implementation of the techniques promoted by AgFor. In addition, AgFor's field schools have played a significant positive role by bringing in experts to provide practical, hands-on instruction to farmers. The District Government plans to integrate all of the activities conducted by the AgFor team into the District's Medium-Term Development Plan *(Rencana Pembangunan Jangka Menengah Daerah/RPJMD)*, such as the sustainable management of natural resources, conservation of water resources, reforestation, and the management of land through the principles of agroforestry'. ■

**L to R: James Roshetko, Syamsu Alam, Nurdin Abdullah, Pratiknyo Purnomosidhi. The district head and the head of the district planning agency of Bantaeng engage in discussions with the AgFor team on 29 August 2016 at Pantai Marina, Bantaeng. Photo by: ICRAF/Amy Lumban Gaol**

# AgFor achieves substantial results in Cikoro village in Gowa

*Author: Syamsuddin (A farmer participating in an AgFor initiative)*

I live in the village of Cikoro, in the district of Gowa, South Sulawesi. My name is Syamsuddin and I am one of the many farmers living in this village. I have derived my livelihood from agriculture for many years. The area around our village contains significant agricultural and natural resources, providing direct benefits for farmers. The land here provides an excellent environment for a wide range of crops, including coffee, cloves, cocoa, passionfruit, jackfruit and avocado, all of which can generate excellent yields if carefully and appropriately cultivated by farmers. As my sole means of deriving a livelihood, the agricultural sector is vitally important for me and my family. Thus, I am highly motivated to expand and improve my knowledge of this sector.

I have lived my entire life in the village of Cikoro and I have always cultivated coffee as the sole crop on my farm. In order to reap the highest possible yields of this crop, I always used to plant the coffee plants very close to each other. However, the results were always disappointing. The coffee I produced was of low quality, with the beans of small size and often infested by worms. I never knew what I was doing wrong and I kept on cultivating the crop in the same old way. All I could do was pray that my yields would improve.

Farmers of Samaturu Mandiri group producing organic fertilizers, assisted by AgFor staff in Mr Syamsuddin's home-garden. Photo by: ICRAF/Andi Prahmono

This was the situation in which I found myself until around April 2014. At this time, however, I received a wonderful opportunity to improve my understanding of farming techniques when AgFor began to conduct its training activities in our village. The AgFor Sulawesi team first started work in our village with a discussion and an exchange of opinions about farming conditions in Cikoro and surrounding areas. I have to admit that we didn't immediately welcome or seize the opportunities offered to us.

However, after several meetings and training with the AgFor team, we became more accepting of the guidance provided to us, which focused on the primary crops of farmers in the village, which were mostly the same as I grew. Personally, I was extremely grateful to be able to develop my understanding of agroforestry techniques.

Unfortunately, while around 50 farmers took part in the discussions at the early stages, the number began to fall off

until, in the end, I was the only one taking part. Even though I was the only farmer participating, I am grateful that the AgFor team continued to provide facilitation and information.

As time went by, I became increasingly aware that I wasn't able to facilitate change all on my own. I began to actively encourage the other farmers to return to the training sessions provided by the AgFor team. Previously, the training had been conducted at the village of Palangkeke. Next time, to make it easier for neighbouring farmers to attend, I agreed to make my house available for the AgFor training sessions.

After a few months, the number of farmers participating in the group had expanded to around 20. We called this farmers' group the AgFor Arabica Group. We were highly motivated to put the knowledge and guidance that we received into practice, so we divided the group into 11 smaller groups, each of which focused on a different activity, including the manufacture of compost, of liquid fertilizer, mapping activities, agroforestry techniques and the use of pesticides.

Towards the beginning of 2016, our farming group was beginning to function well, largely due to the unceasing commitment of the AgFor team members, who continued to provide assistance to us throughout the period. After we had produced high-quality seed stock for a number of different commodities, AgFor provided us with marketing assistance. With the goal of expanding the markets for our products, we engaged in initiatives to expand into Makassar, Bontonompo and Takalar to market our organic fertilizer, pesticides, fruit and other crops. We received good responses, with a large number of requests from purchasers. With input from the AgFor team, we decided to establish a cooperative to facilitate the storing, organization and marketing of our crops. We gave this cooperative the name Samaturu Mandiri, which means 'working together to achieve autonomy'. This group now consists of 29 permanent members, with an additional 43 temporary members.

When I first became involved with the initiative, I never imagined that we would end up by establishing a cooperative to facilitate production. However, because of the assistance provided by AgFor, we managed to achieve results that would have seemed impossible when we first started. AgFor provided many other forms of assistance as well. The AgFor team provided major assistance in terms of establishing our cooperative and providing overall guidance to ensure that it ran well. And they didn't just conduct this training in our village. The team enabled us to expand our horizons and to improve our knowledge by providing us with training in a number of cities and by giving us the opportunity to participate in comparative study tours so that we could gain a better understanding of how farmers operated in conditions elsewhere.

We received many significant benefits from our involvement with the AgFor team. First and foremost, they enabled us to change our way of thinking. For example, we used to think that to achieve any important results we needed a lot of funding. However, the AgFor team taught us that this wasn't always the case. We received training to enable us to meet our needs by using available resources that we hadn't previously used, with these resources even providing us with a means of generating additional incomes. One of the most clear examples of this relates to the production of organic fertilizers and pesticides. We were previously completely unaware of the agroforestry techniques presented to us by the AgFor team but they provided us with the means to generate solutions to enable us to use land that previously couldn't be used for the cultivation of even a single crop. Using agroforestry techniques, we found that we were able to cultivate three or four different crops on such land simultaneously, which significantly improved our opportunities to generate an income from our land.
At a personal level, I am extremely grateful to the AgFor team. I genuinely hope that after implementing their programs here, AgFor will conduct projects throughout the rest of Indonesia to enable farmers across the nation to benefit and to improve their lives, just as my friends and I in the village of Cikoro have done. I offer my sincere and warm thanks to AgFor for all that they have done! ■

# The AgFor team: expanding knowledge and sharing information

*Author: Ibrahim (Community Relations Unit, District Government of Jeneponto)*

Everyone involved in community empowerment and environmental initiatives in South Sulawesi is aware of the AgFor team's contributions in these areas. As a provincial government employee, I have seen the results of their initiatives in the field with my own eyes; generating significant benefits for farmers, facilitators and farmer-facilitators. In the district of Jeneponto, the AgFor team's activities have created a synergy between local communities, community groups, environmental protection groups, tertiary institutions and government agencies in their endeavours to increase farmers' incomes through the application of agroforestry techniques and effective management of natural resources.

Their initiatives with farmers have involved a range of activities intended to develop rural communities. They have achieved this through activities to increase community incomes, particularly the incomes of farmers, by implementing effective land management techniques, and by developing sustainable systems of environmental management through the application of agroforestry techniques.

Agroforestry systems involve the cultivation of a range of different crops on a single farm. These systems integrate the principles of agriculture with the principles of forestry, with farmers planting trees together with a number of food crops, with the land also used for animal husbandry. The AgFor team's agroforestry programs are highly innovative, generating significant benefits for members of participating communities.

In addition, by developing synergies between local government agencies and other stakeholders, the AgFor team has been able to facilitate the widespread dissemination of information and knowledge regarding agriculture and forestry throughout the community.

In addition to the actual knowledge and skills acquired by farmers, the AgFor teams' methods of disseminating this knowledge and experience have also had a significant positive impact. For example, the methods have included community-based journalism to generate wider awareness of the results that can be achieved through agroforestry and other innovative techniques in farming, crop cultivation and animal husbandry. The AgFor team has conducted extremely valuable training in areas such as writing and other journalistic techniques for community members.

As a district-level official involved in community relations and protocol, I personally feel that I have derived direct benefits and am able to better implement my duties as a result of participation in this training. Through its Community Relations and Protocol Unit, the District Government works to develop synergies with farming communities. Now, as a result of what I learned in the community journalism training course it is much easier for me to publish and share information throughout the broader community.

In July 2016, the AgFor team invited me and several other members of the Community Relations and Protocol Unit to participate in a Community


**Participants of Citizen Journalism training writing down their ideas and thoughts in their personal blog that was just being created on the training. Photo by: ICRAF/Amy Lumban Gaol**

Journalism Workshop facilitated by the BaKTI Foundation in Makassar. This training was highly practical and took advantage of developments in information technology and social media, both of which have become highly efficient and effective means to rapidly disseminate information. It is extremely important for all in the community to fully understand the role of social media in the dissemination of information to members of the public. This training involved a number of bloggers who served as mentors to assist with participants' development of writing skills and techniques. The involvement of these bloggers in the training process was extremely useful to me and has enabled me to better implement my duties as a member of staff of the Community Relations and Protocol Unit.

The District Government has derived significant benefits from the training course in the implementation of its day-to-day tasks, since these tasks always involve the public interest and require a high level of community participation. In its endeavours to accelerate development in the district, the Government of Jeneponto now conducts an extremely effective program of disseminating information through social media, enabling news related to development initiatives to be spread rapidly throughout the community.

Increasing our ability to meet community demand for high-quality information is extremely important in us fulfilling our role effectively. All members of the community require access to a wide range of essential information and we hope to be able to expand our range of skills even further. We hope that after the conclusion of the AgFor project in South Sulawesi, we will be able to keep the spirit of the program alive and be able to meet the needs of the community for information and knowledge. For example, for farming communities we hope to provide written material and also facilitate training in planting and crop cultivation. We want to ensure that the written material we provide is interesting and relevant to the target audiences just as effectively as if our colleagues from AgFor were still directly providing us with training to improve our knowledge and skills.

Mr Ibrahim from Jeneponto District during a discussion in Citizen Journalism training in BaKTI office, Makassar. Photo by: ICRAF/Christine Mailoa

The Community Journalism initiative has also played a significant positive role in enabling the District Government to manage the dissemination of information in other areas. This initiative has also enabled us not just to serve the community better, it has developed our ability to engage and interact with representatives of the media. We are now better able to present information or make contributions in the form of articles or news releases both to print and online media through our improved capacity. AgFor also provided assistance in a number of other areas and I have experienced the benefits of all of these activities. AgFor has played a significant role in developing the capacities of the District of Jeneponto at all levels of society, with these activities directly benefiting members of the community, the staff of government agencies, and many others. On behalf of the District Government of Jeneponto, I would like to express my utmost gratitude and appreciation for AgFor's outstanding contribution to improving communication and the dissemination of information in our district. ■


All participants of Citizen Journalism training taking picture together. Photo by: ICRAF/Christine Mailoa

# AgFor Sulawesi team: making the transition from chemical to organic fertilizers in South Sulawesi

*Authors: Pratiknyo Purnomosidhi, Mulus Surgana, Asep Suryadi, Iskak Nungky Ismawan, Andi Prahmono*

When the Agroforestry and Forestry in Sulawesi (AgFor) team commenced its activities in 2012 in the districts of Bantaeng and Bulukumba, in South Sulawesi Province, they found that the farmers tended to cultivate their crops according to a system of monoculture, using mainly chemical fertilizers. The farmers stated that the main reason for their use of chemical fertilizers was that these were easy to obtain and that they produced quick results.

As the AgFor teams conducted their activities in villages in two districts, team members came to realize how difficult it was for farmers to purchase urea-based fertilizers. Farmers could only buy them if they produced a letter of recommendation from a

The making of organic fertilizers in Karang Loe watershed area, Garing village, Gowa district. Photo by: ICRAF/Mulus Surgana

Female farmers are also participating in producing organic fertilizers. Photo by: ICRAF/Megawati

farmers' group or from a field trainer in their village. This policy was promulgated by the government in order to address the scarcity of fertilizers and the associated price volatility in the planting season. As a result, compound fertilizers containing a liquid solution of nitrogen, phosphorus and potassium (NPK) became an alternative in the marketplace. Two years later, AgFor teams operating in two other districts—Jeneponto and Gowa—found a similar situation.

## The AgFor team devises a solution

After considering the situation in depth, the overall AgFor team concluded that farmers in Bantaeng, Bulukumba, Gowa and Jeneponto had excellent potential to produce their own fertilizers, with almost all members of the farming groups rearing livestock, such as horses and goats. However, the farmers did not use the manure to produce fertilizers because of lack of knowledge about how to make and use organic fertilizer.

The team decided to assist the farmers in two phases.

1. *Raising the awareness of the farmers and providing them with initial training*: The AgFor teams in each district explained to the farmers that they need not depend on expensive, difficult-to-source chemical fertilizers because the fertilizer that they could produce from readily-available animal waste and plant matter could be used to make fertilizer of excellent quality. Next, the farmers were provided with training in how to produce compost and liquid organic fertilizer to replace chemical fertilizers, with these alternative fertilizers produced in either open or closed containers.
2. *Providing farmers with additional training on animal husbandry*: This training was provided to enable farmers to rear animals in a way that their manure could be used to produce fertilizers.

During both of these two stages, many of the farmers initially displayed some disbelief. However, after seeing the success of several early adaptors, an increasing number of farmers took on the new methods.

## A success story: a farmer in South Sulawesi starts using organic fertilizers

Muhammad Halim, from the village of Rappolemba in the district of Gowa, was one of the participating farmers. As a member of the Sa'be Lawang farmers' group, Halim learnt not only how to produce organic fertilizers but also a number of techniques about how to better manage his land, including planting trees at optimal distances from each other and the use of other agroforestry techniques.

Prior to his participation, Halim had relied exclusively on the use of chemical fertilizers. He experienced intense frustration because of frequent crop failures. At the beginning of 2015, after yet another failed crop, he decided to clear the existing crops from his farm to enable him to implement the techniques that he had learned.

Halim produced liquid organic fertilizer with members of his farmers' group on his farm of approximately five hectares before applying it to his chayote (*Sechium edule*) plants.

'After I began using the organic fertilizer, my crop yields increased dramatically. In a single year, I could harvest crops twice', he said. 'In addition, the pumpkins that I produced were larger than previously, with a higher yield and with a better flavour'.

At another location, Syamsuddin, a member of the AgFor Arabica Farmers'

Monitoring activity on liquid organic fertilizers needs to be done one week after the making process started. Photo by: ICRAF/Megawati

Group in the village of Cikoro, enjoyed similar benefits. Through experience on his own farm, he came to realise the effectiveness of liquid organic fertilizers and compost. He was inspired to share his experience with other members of his community. Syamsuddin began to produce the liquid fertilizers and compost and to share these products with other members of his group. He also made his house available for sharing information related to agroforestry and the other innovative techniques that he had learned through his participation in the initiative. After experiencing for themselves the benefits of using organic fertilizers and applying agroforestry techniques, Syamsuddin and other members of his group established a cooperative to facilitate the sustained use of the techniques and to maintain the high levels of productivity that they had achieved.

Syamsuddin now serves as one of the managers of the Sama Turu Mandiri Cooperative, which is engaged in the routine production of organic fertilizer and its sale in a number of venues. The District Forestry Agency of Gowa is one entity that has purchased his products, with repeat orders for around 200 litres of liquid fertilizer and 150 sacks of compost. Since he began producing organic fertilizer, Syamsuddin has made three sales to the District Forestry Agency, conducted through a former head of the agency. While this agency and others do not place orders on a routine basis, there is always significant demand for these organic products, with purchasers including other farmers both from Syamsuddin's own village and those in surrounding areas.

These products are sold for IDR10,000 [±USD0.70 in November 2016] per litre of liquid fertilizer or sack of compost. According to staff at the District Forestry Agency, these products are highly effective, facilitating excellent growth of crops.

Members of the participating farmers' groups hope that in the future, intensified marketing of their organic fertilizers will enable them to generate even better incomes. In addition, they hope that such marketing will encourage other farmers in the sub-district of Cikoro and throughout South Sulawesi to adopt the use of organic farming techniques, particularly the use of organic fertilizers and natural pesticides. There are some signs that this process has already begun. For example, farmers are now beginning to collect the wastes produced from the cultivation of coffee crops and to set this waste aside for the production of highly-effective compost. ■

# Success Stories from Southeast Sulawesi

# Agroforests are greening Awua Jaya village

*Author: Hendra Gunawan*

The village of Awua Jaya, located in the sub-district of Asinua, is difficult to reach owing to the poor state of the roads and the dry terrain in the area. This remote location constrains access to both print and digital media and therefore restricts the dissemination of information to inhabitants of the area. Most members of the community in this village are farmers, transmigrants from rural areas of East Java who were forced to relocate following the eruption of Mount Kelud in 2010. The eruption rendered their land unsuitable for farming and deprived them of their livelihoods.

Wahyudin, 42 years-old and originally from Madiun, East Java, is one of the transmigrants. Having only graduated from junior high school, he moved to Sulawesi in order to seek a living for himself and his family. In addition to being a hard-working farmer dedicated to the reforestation of the areas surrounding his village, Wahyudin also serves as an *ustad*, an Islamic preacher.

He expressed a strong desire to receive training in the sustainable use of non-timber forest products as a means to improve his community's livelihoods while at the same time empowering the community to play a role in conserving the natural environment, including water sources located on the low plains in the areas in and around Aabuki, Unaaha and Kendari.

With several other members of the community of Awua, Wahyudin engaged in an initiative to reforest the

**The condition of the land in 2012, before AgFor commenced its initiative. Photo by: ICRAF/Hendra Gunawan**

The condition of the land in the area behind the mosque, after AgFor commenced its initiative. Photo by: ICRAF/Hendra Gunawan

surrounding dry plains by planting shade trees, despite the acknowledged difficulty of successfully planting vegetation in this area, with trees and other plants tending to die before reaching maturity.

Towards the end of 2013, the AgFor team started working in Awua Jaya. Their initiative, which was intended to raise the awareness of farmers and to provide space for them to expand their knowledge, was greeted warmly by members of the community. The AgFor team conducted activities to enable members of farmers' groups to increase their productivity as a means to improve community livelihoods. In the past, farmers depended heavily on rubber as their primary crop but as a result of the AgFor team's help, they have now achieved significant diversification. When AgFor commenced, farmers' level of knowledge regarding agroforestry techniques and mixed plantations, or even regarding the cultivation of crops apart from rubber, was very low, with little knowledge of the techniques related to the cultivation of cloves, durian etc. In order to ensure the sustainability of production, the AgFor team provided extensive training and information by establishing demonstration plots to improve farmers' knowledge of mixed cropping, with the plots being used to cultivate multiple crops, including combinations of sengon, rubber and pepper; ginger and rubber; and rubber and patchouli.

In 2014, in recognition of his high level of commitment to reforestation activities in the community, the AgFor team and the Agriculture, Plantations, Fisheries and Forestry Extension Unit *(Badan Penyuluh Pertanian, Perkebunan, Perikanan dan Kehutanan/BP4K)* appointed Wahyudin as a farmer-facilitator to motivate and teach other members of the community about agroforestry and home-garden techniques.

The teaching method used in this initiative involved a process of farmer-to-farmer peer sharing and sharing of information. Wahyudin used a range of activities and events to share his experiences with other farmers, describing and demonstrating how he had

used a field of one hectare to generate daily, weekly, monthly and annual revenues through the application of agroforestry techniques.

On any single day, he explained, he would be involved in rearing ducks and chickens to produce eggs, feeding fish and other livestock, planting vegetables and fruit trees, or caring for his rice fields. During one training session, Wahyudin told those attending that all of them were fully capable of generating sufficient income to meet their needs through agriculture and animal husbandry. He said that even a household's children could play a role in generating an income by assisting in the rearing of poultry.

In addition to agriculture, Wahyudin encouraged members of the community to raise goats and to use their manure to produce compost as a means of increasing their incomes, explaining that organic compost had been clearly demonstrated to be an effective, cost-efficient means of ensuring the fertility of soil.

Another district government agency, the Agricultural, Plantations, Forestry and Food Security Extension Unit *(Badan Penyuluhan Pertanian, Perkebunan, Kehutanan dan Ketahanan Pangan/BP3KKP)*, engaged in routine monitoring of Wahyudin's farmers' group. They found that members of the group had expanded their knowledge and understanding of the innovative techniques and that they could play a valuable role in propagating these techniques amongst other farmers in surrounding villages, Nekudu, Lasada and Awuasari. Wahyudin and other members of his group now serve as motivators to propagate techniques of agricultural, plantation and forestry management and to demonstrate how small plantations can be transformed to become a valuable asset for the future. With innovative technologies provided by *BP3KKP*, the farmers' group now has an improved ability to use non-timber forest resources.

The socio-economic circumstances of the transmigrant farmers participating in the initiative are now slowly but steadily improving. As a result of their improved circumstances, an increasing number of participating farmers are able to renovate their homes. They have been empowered to achieve this by being provided with the appropriate information to engage in the sustainable cultivation of high-quality crops. The AgFor team's initiative has enabled them to gain a better understanding of the means to cultivate crops to provide long-term benefits.

In addition to working with other farmers, Wahyudin has demonstrated a high level of commitment to improving the district government's system for the dissemination of information and the provision of training. Over three months, he regularly visited the BP3KKP offices to explain how its systems for the dissemination of information and knowledge could be improved. As a result of his frequent assistance, the unit's staff have intensified their activities and established an Agroforestry Information Centre in cooperation with AgFor to motivate and encourage farmers to produce seedlings and seed stock.

The village of Awua Jaya now serves as an example and a model for neighbouring villages, demonstrating the means by which farmers in these villages can improve the use of their land and providing raw materials to enable them to do so. As a result, many people from other villages who wish to improve their productivity and to increase their yields visit the village to purchase seedlings and other products.

In general, the quality of the environment around Awua Jaya has improved dramatically since AgFor first commenced its initiative in 2011. The fields around community members' homes are now green, filled with trees and plants of a range of different species. Now, most members of the community plant nutmeg and pepper in the shade produced by these trees.

In 2016, facilitators from *BP4KKP* stated that they would provide support for the construction of new agroforestry demonstration plots in farms belonging to farmers participating in AgFor, including the provision of ginger seeds. In future, it is hoped that members of the community in the village of Awua Jaya will be able to produce and sell seedlings and seed stock for a range of different crops. It is hoped that this village will continue to serve as a model and an example to empower farmers throughout the area to improve their management of the land that they farm. ■

# Agreeing on tree commodities preserves a Grand Forest Park

*Authors: Jhon Roy Sirait and Hendra Gunawan*

The Nipa-Nipa Grand Forest Park covers 7877 hectares, conserving a wide range of both exotic and endemic species of flora and fauna. In addition, Nipa-Nipa is a site for research and for educational, cultural, social and agro-tourism activities. It has significant economic value for members of surrounding communities.

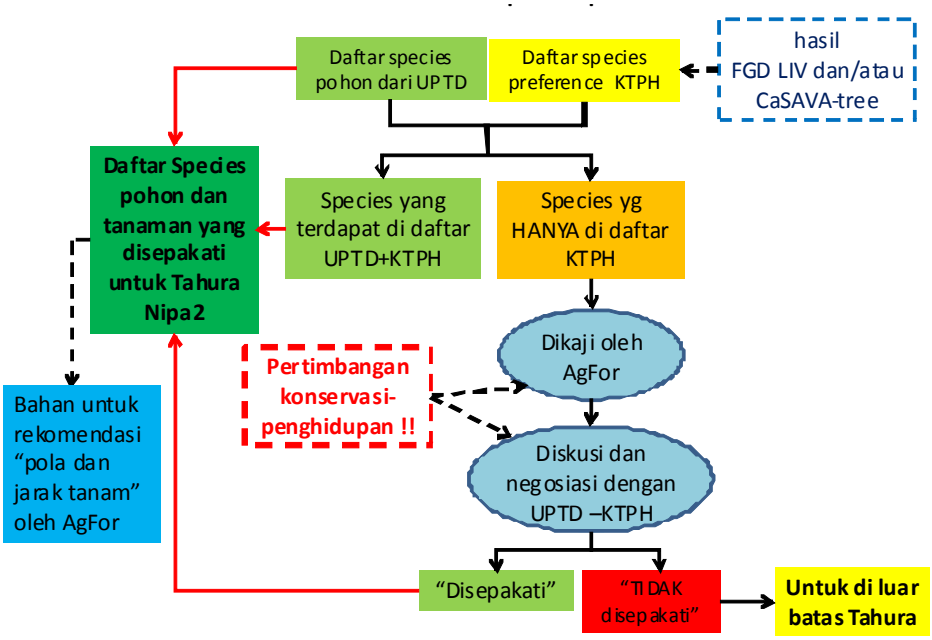
To facilitate the economic empowerment of communities in areas surrounding the conservation area and to prevent the outbreak of social conflict, Nipa-Nipa has been divided into four zones: 1) a protected zone of 3319 hectares; 2) a use zone of 3147 hectares; 3) a plant collection zone of 699 hectares; and 4) a zone assigned for other uses, of 711 hectares. This lasts zone consists of a special block that has been designated for management by members of surrounding communities who are part of forest conservation farmers' groups. A number of activities are permitted in the block, based on an agroforestry system that has two functions: 1) provide livelihoods; and 2) ensure the conservation of Nipa-Nipa.

Planting in Nipa-Nipa has often resulted in conflict between farmers and managers of the Park. Farmers wanted to cultivate crops of economic value whereas the managers wanted to restrict access to ensure conservation. To resolve the conflict, the idea developed of introducing crops that could enable both parties to fulfill their needs.

In 2014, the AgFor Sulawesi team developed a Livelihoods and Conservation Strategy that identified trees that could be grown by farming groups in areas under their management. The working group comprised members of forest conservation farmers' groups, Board of Management of Nipa-Nipa, Kendari Agriculture and Forestry Agency, Komunitas Teras NGO and AgFor. The group facilitated negotiations to reach agreement on the range of species of trees that could be planted in Nipa-Nipa.

This stage of the process was conducted through focus groups and formal meetings with both the farmers' groups and the Board. Following this, both parties were brought together to agree on the species of trees that could be planted within the specific zone.

Before agreement was reached, the working group had created




**The framework of negotiation to get agreements on tree commodities in Nipa-Nipa Grand Forest Park.**

Measuring the agreed tree commodities in Nipa-Nipa Grand Forest Park. Photo by: ICRAF/ Jhon Roy Sirait

a list of tree species based on Decision No. 424/28/ BTNN/2014 by the Head of the Board of Nipa-Nipa concerning species permissible in the specified zone.

The purpose of the negotiations was to prevent misconceptions and differences of opinion regarding the management of agroforests and forests. This was necessary because the managers had not developed a mechanism to generate input from the forest conservation farmers' groups about which trees were permitted. However, both farmers and managers were committed to developing a harmonious relationship and a mutual sense of ownership of conservation of the greater forest zone.

In July 2016, the results of the negotiations were formalized in the promulgation of a Governor's Regulation and then a memorandum of understanding signed by representatives of both the Forest Conservation Farmers' Group Subur Makmur Kelurahan Watuwatu and the Board of Management of Nipa-Nipa on the site of the land under the management of the farmers' group. The MoU defines the species of fruit and timber trees that could be planted; the distance between the trees; and the production of seedlings. All of these were included in the forest conservation farmers' group's management plan, which was created collaboratively by the farmers and managers.

Mr Joka (of Tumbuh Subur farmers' group) is identifying trees in his home-garden. Photo by: ICRAF/Jhon Roy Sirait

The agreement enabled all parties to fulfill their responsibilities and meet their aspirations through a combination of unique features.

1) The establishment of the cooperative agreement between the Board of Management of Nipa-Nipa and the Forest Conservation Farmers' Group Subur Makmur Kelurahan Watuwatu was a participative learning process that identified the species of trees that could be planted within the Nipa-Nipa conservation zone.
2) The Board of Nipa-Nipa would be able to realize the optimal development of the special block within the fourth zone through collaboration with the forest conservation farmers' groups and others.
3) The system of agroforestry and forestry management developed under the agreement will provide economic benefits to members of surrounding communities and facilitate the conservation of the zone.

Consideration will be given to the inclusion of new species of trees that meet the farmers' needs and are compatible with conservation objectives. ■

# Replicating Southeast Sulawesi's agroforestry initiatives in Aceh

*Authors: Mahrizal, Hendra Gunawan, Heru Maulana, Gusti Kusuma*

The cultivation of cocoa on a large scale in Aceh began with the implementation of the Rehabilitation and Expansion of Agricultural Commodities for Export *(Rehabilitasi dan Peningkatan Tanaman Ekspor/ PRPTE)* program in the 1980s. Production reached its peak in the 1990s, the 'golden time' for this commodity. However, with the escalation of the armed conflict in Aceh at the end of the 1990s until 2004, the output of cocoa declined. Farmers were unable to tend their groves and to maintain their crops because of security concerns, as a result of which many cocoa plantations were in poor condition, with many trees affected by disease and with the average age of the trees increasing. As a result, the cocoa produced in Aceh came to be categorized as 'forest cocoa'. A number of programs implemented by government agencies and civil society organizations, such as the Program Gernas Kakao, and others funded by multi-donor agencies were unable to fully address the challenges facing the sector.

As with Aceh, the province of Southeast Sulawesi also significantly increased its production of cocoa through participation in the PRPTE project, the Program Gernas Kakao, and various others from the 1980s onwards. However, unlike Aceh, this province was not affected by armed conflict. Communities throughout the province welcomed the implementation of these programs with enthusiasm. The Program Gernas Kakao and the various others were highly effective in terms of increasing productivity, promoting techniques of grafting to rehabilitate cocoa trees, effective control of pests and disease, building of farmers' institutional capacities, provision of marketing assistance, and the application of agroforestry. With the successful implementation of measures to improve productivity in the sector in Southeast Sulawesi, farmers in Aceh decided to learn from the experience of their counterparts in the cocoa sector in Southeast Sulawesi.

## Farmers from Pidie visit LEM Sejahtera and community cocoa plantations in Kolaka Timur District

The idea of conducting a study tour for cocoa farmers was first conceived at a national workshop conducted in Jogjakarta on National Cocoa Day in September 2015. During informal discussions between the AgFor Sulawesi team and the Head of Pidie's District Forestry and Plantation Agency, the possibility arose of conducting a study tour to facilitate the sharing of experience between cocoa producers in Southeast Sulawesi and Pidie.

Mr Noster, the owner of a multi-crop, cocoa and pepper plantation, sharing his experience to farmers from Pidie, Aceh. Photo by: World Agroforestry Centre (ICRAF)

The tour eventually took place 9–14 August 2016, facilitated by Southeast Sulawesi's Provincial Plantation and Horticulture Agency, AgFor Sulawesi, Kolaka Timur District's Plantations and Horticulture Agency, its Executive Agency for Agricultural, Fisheries and Forestry Extension *(Badan Pelaksana Penyuluhan Pertanian, Perikanan, dan Kehutanan/BP4K)* and LEM Sejahtera, a community economic empowerment organization based in the sub-district of Lambandia.

The study tour was intended to enable farmers to witness all stages of cocoa production in the visited areas, including both monocultural and agroforestry systems, post-production processes, and farmers' institutions and organizations. It was hoped that the visit would enable the

participating farmers from Pidie to act as agents to propagate the knowledge they had gained amongst other farmers in Aceh.

The study tour involved a total of 26 participants from Pidie, of whom 11 were farmers, with the remainder being facilitators and trainers from Pidie's District Plantation and Horticulture Agency. At the opening event, held in Kendari on 10 August, the Head of Southeast Sulawesi's Provincial Plantation and Horticulture Agency, Ir Bambang MM, gave a presentation on the potential of cocoa as a commodity, on the role of community economic empowerment organizations, on the significance of pest infestations, disease, plant age and lack of maintenance as a cause in the decline of production, and on the low level of trust that farmers had for facilitators and trainers from government agencies.

'To enable producers of cocoa to generate higher levels of income', he said, 'one of the most important factors is institutional capacity building, with effective farmers' organizations being vitally important for fostering a shared vision and commitment by farming communities'.

Distribution of AgFor's technical guides to farmers from Pidie during their visit in September 2016. Photo by: World Agroforestry Centre (ICRAF)

During the tour, participants were divided into three smaller groups, with different activities for each: the first group visited the village of Bou to study cocoa cultivation techniques and soil health and fertility; the second visited the village of Penanggoosi to study cocoa cultivation and grafting techniques; and the third visited the village of Tinete to study institutional capacity building and the role of farmers' organizations in the production process.

Activities to study cocoa cultivation techniques in the village of Bou were conducted in a plantation belonging to H. Darman, a cocoa producer who had facilitated a significant wide-scale transformation in his community, with significant improvements to farmers' socio-economic circumstances. In order to inspire the participants to apply innovative techniques to cultivate cocoa, H. Darman described his experiences with this commodity.

He told the participants that in 2012, members of the farming community in the village of Bou were extremely frustrated at the low level of productivity and the poor yields that they derived from cocoa as a result of infestations of pests and diseases and of the decline in the level of fertility of the soil. A large proportion of the community had already begun to cultivate other crops. However, this situation slowly began to change following the provision of training and guidance by LEM Sejahtera and AgFor Sulawesi.

'Initially, it was extremely difficult to motivate farmers to participate in the training activities', he said. 'Nothing is more difficult than shaking people awake, encouraging the deaf to listen, and opening the eyes of the blind'.

Welcome address by the Head of Southeast Sulawesi's Provincial Plantation Agency. Photo by: World Agroforestry Centre (ICRAF)

## Agroforestry plantations for mixed crops of pepper and cocoa, and nurseries

Following this, the participants visited a cocoa plantation in which agroforestry techniques had been applied, together with a nursery used to produce pepper seedlings. This visit expanded the participants' awareness of the potential of pepper as a commodity and increased their understanding of effective cocoa cultivation techniques. On the first day of this visit, the Head of Kolaka Timur's BP4K, Dr Ir Idarwati MM, welcomed the participants, encouraging them to, 'Learn as much as you can while you're here and apply what you've learnt in your own areas'.

This was followed by a visit to a pepper nursery that had been established with funding provided by the village of Tasehea's Village Funds *(Anggaran Dana Desa)*. This village had participated in the AgFor Sulawesi initiative. 'Initially, to establish this nursery, the production of high-quality pepper was conducted by the AgFor team exclusively for participating farmers', said Made Lomiana, the Head of Village Consultative Body *(Badan Permusyawaratan Desa/BPD)*. 'However, other members of the community also began to produce seedlings when they realized that the nursery produced excellent seedlings that could be put to immediate use in farmers' own plantations or sold to other members of the community.

The participants also engaged in learning activities at a demonstration plot established with guidance from the AgFor team that had been used to apply agroforestry techniques to cultivate both cocoa and pepper, with discussions with the plantation's owner and the AgFor team related to the cultivation of mixed crops of cocoa and pepper, the benefits of multi-cropping, the use of bokashi (bokashi composting is an anaerobic process that relies on inoculated bran to ferment vegetable and other food waste) organic fertilizer produced by the farmers themselves using animal manure and vegetable waste, the use of natural pesticides, and the increase in output resulting from the use of these techniques. In particular, the participants from Pidie also gained hands-on experience in techniques to select and plant pepper seeds.

The participating farmers and officials from Pidie. Photo by: World Agroforestry Centre (ICRAF)

Visit to a multi-crop, cocoa and pepper plantation using agroforestry techniques in Kolaka Timur district. Photo by: World Agroforestry Centre (ICRAF)

At the end of this activity, the Head of Pidie's District Forestry and Plantation Agency, Ir Syarkawi, said that, 'On behalf of all the participants from Pidie, I would like to express our deepest gratitude. Even during this short visit we have obtained new knowledge and many other benefits. As the official responsible for this activity, I intend to submit a report to the District Head of Pidie in the hope that the techniques that we have studied here will become an integral component of the District Forestry and Plantation Agency's program. We hope that as a result, long-abandoned cocoa trees in Aceh will be revived and that the level of productivity will increase through multi-cropping with pepper, through grafting techniques, and through the implementation of agroforestry'.

The AgFor Sulawesi team distributed technical guides to the participants—*Cultivating Pepper*, *Cultivating Cocoa in Multi-Crop Plant*ations, *The Cultivation of Coffee*, *The Cultivation of Citrus Fruit*—and some souvenirs. The technical guides are intended to facilitate the development of multi-crop plantations in their own district. ■

# Aunupe's organic compost production facility: transforming agricultural waste into money

*Author: Hendra Gunawan*

I enjoyed the sensation of the cool air as I walked along Andolo Road through the Papalia Protected Forest in Konawe Selatan in the sub-district of Wolasi. As I passed through the entrance gate to the village of Aunupe, I found the road leading to a multi-crop plantation with a range of commodities ready for harvest—such as pepper, citrus fruit, and rubber—which were planted using agroforestry techniques, together with a range of vegetables.

According to official data, Aunupe has a population of around 430, with the majority of villagers deriving a living from farming, woodwork and stonework. The area included in the village's administrative boundaries includes 155 hectares of plantations, 50 hectares of rice fields, 2.5 hectares of settlements, and five hectares of yards. The crops cultivated on the plantations include citrus fruits, cocoa and pepper. In addition, the villagers depend on agricultural commodities including rice cultivated on both irrigated and rain-fed land, together with vegetables and other seasonal crops. Members of the community also derive their livelihoods from forestry,

Maskuri's mixed crop plantation, with pepper and organic vegetables in Aunupe village, Southeast Sulawesi province. Photo by: World Agroforestry Centre (ICRAF)

planting trees of a number of species, including *Gmelina,* 'jabon' (*Anthocephalus cadamba*), teak and 'sengon' (*Albizia chinensis*). One of the most significant constraints faced by the farmers of the village is their dependence on conventional farming techniques. At present, a large proportion of the farmers still use chemical fertilizers and compost.

Maskuri, a 38 year-old farmer from Aunupe who originally came from Central Java, first began farming in Southeast Sulawesi in 2007. He had tried to grow a range of different crops on his plantation but experienced many crop failures. However, he refused to give up and has now achieved a measure of success. In 2012, he took part in a training course conducted by the AgFor Sulawesi team, during which he learnt pruning and grafting techniques. After taking part in a number of other activities, Maskuri significantly expanded his knowledge of effective farming systems. Previously, he had found it increasingly difficult to source fertilizers and other agricultural inputs. His crops were effected by many infestations of pests and diseases, even after he had already sprayed pesticides and applied chemical fertilizers on his land. After receiving training on the production of organic compost from the AgFor team, he started to use it on his plantation, encouraging other farmers in the community to do the same.

With increasing demand for organic compost, the idea of constructing a compost production facility and storage space began to emerge. At a discussion between members of the farming group, the village head, and the AgFor team, Maskuri discussed the need to map the locations of plantations to facilitate the production of organic alternatives to chemical inputs, with assistance provided by a local NGO. At the end of the discussion, the entire village of Aunupe committed to the use of organic inputs in all their agricultural activities.

A picture of female farmers' group that has implemented organic farming in Aunupe village. Photo by: World Agroforestry Centre (ICRAF)

Interview about organic rice field with AgFor staff. Photo by: World Agroforestry Centre (ICRAF)

The compost production facility developed by the partnership between Bank Indonesia, BP4K and AgFor. Photo by: World Agroforestry Centre (ICRAF)

'We are prepared to apply the principles of organic farming at our own initiative at all stages of the agricultural production process, including the preparation of land for farming', said Lukman, Aunupe's Village Head.

With Maskuri's demonstrated commitment to the initiative, he was appointed as a farmer-facilitator with AgFor, his role being to motivate and guide other farmers from the village in the use of organic fertilizer and natural pesticides,

A discussion group of participants in the organic initiative with Mr Lukman, Aunupe village head. Photo by: World Agroforestry Centre (ICRAF)

produced using material such as vegetable waste from their farms. In his work, he received support from the AgFor team, which provided him with information about innovative technologies and training in establishing organic compost production facilities at a number of locations throughout the village.

As a result of hard work over several years, these organic compost production facilities have begun to yield demonstrable material benefits.

'As a result of the training we received from the AgFor team, we are now able to sell organic fertilizer at IDR20,000 [± USD1.50 at November 2016] per sack. Not all farmers in the village always use organic fertilizer but we have made extraordinary progress', said Maskuri. 'Usually, when we harvest mustard, beans, eggplant, capsicum and bitter gourd, we sell them to buyers who come to our plantations. The total value of our sales can amount to around IDR2,000,000 [± USD1500], compared to a price of a single bundle of vegetables at IDR1000–IDR2000 [± USD0.07–0.15]. The compost production facility has really provided significant benefits to the farmers of Aunupe'.

The initiative to transform Aunupe into an organic village has received enthusiastic support from a number of parties. Government agencies at the village, sub-district and even the provincial levels have all greeted this initiative enthusiastically. This support will play an important role in enabling the organic farmers of the village to engage in a cooperative endeavour with Bank Indonesia through the community's participation in the Pilot Cluster Project.

Survey of potential locations for organic production in Aunupe village. Photo by: World Agroforestry Centre (ICRAF)

Signing of the minutes at a meeting of people involved in the preparation of the organic initiatives master plan. Photo by: World Agroforestry Centre (ICRAF)

Discussions related to the establishment of a partnership with the district development planning agency and Bank Indonesia first commenced with a meeting at the office of the agency in the District of Konawe Selatan on 2 November 2015, with an intensive discussion related to strategies for development following the conclusion of the AgFor project. Following these discussions, all agreed to work together to transform Aunupe into a model village to demonstrate the benefits of the application of agroforestry techniques to farmers throughout Konawe Selatan. At the district level planning meeting, proposals for the development of organic agriculture in Aunupe were recommended for inclusion in the district work plan, with their formal adoption into the district's 2016 Medium-Term Development Plan, to be implemented in cooperation with the national Ministry for Agriculture and Food Security.

# Expanding markets for Mepokoaso Pasoema Uluiwoi honey

*Authors: Mahrizal and La Ode Ali Said*

In the past, the market opportunities were very limited for the Mepokoaso Pasoema Uluiwoi (MPU) cooperative. These opportunities have now expanded dramatically, with the cooperative penetrating international markets, particularly in Malaysia.

**One of the honey farmers (*pasoema*) showing beehives which will be processed into wild honey. Photo by: ICRAF/Christine Mailoa**

While MPU's early sales to Malaysia have amounted to just 35x600 millilitre bottles, it is a positive first step towards expanding the cooperative's domestic and international sales.

The pure forest honey produced by the cooperative has a unique flavour, differing from honey from other areas. According to Ali, a purc haser from Malaysia who trades in honey, 'It has a sweeter flavour than many other honeys that I import'.

Muammar, an Indonesian citizen who is a resident of Malaysia, agreed: 'MPU's honey is really fresh and delicious'.

## Preserving traditions and creating local identity

The forest honey collected by MPU is produced by bees of the *Apis dorsata* species in the upstream of the Konaweha River in the sub-district of Uluiwoi, Kolaka Timur District, Southeast Sulawesi Province, about five hours drive from the provincial capital, Kendari. The river passes through four districts and municipalities: Kolaka, Kolaka Timur, Konawe and the municipality of Kendari. It plays a significant role in the lives of the community in Uluiwoi, enabling them to meet many of their basic needs. It is a source of drinking water, a place for washing and bathing, it irrigates their land, and it can be used as a transport route to the city of Unaaha. The river plays such an important role in the life of the community that a picture of it features on the label of MPU's honey, as an identifying symbol of the community that produced it.

For members of the Uluiwoi community, the collection of forest honey is a significant alternative source of income in the dry season. Although agriculture is the principal source of income for most members of the community, with farmers mainly involved in the cultivation of cocoa, seasonal crops and horticultural products, most of them also routinely engage in the collection of forest honey when it is available, which is mainly in the dry season.

According to Iskandar, Tawanga's village head, members of the community have been collecting honey for many generations.

'Even before farmers from this area began to sell honey, they used to collect it for their own private consumption. They used it as medicine. They used the beeswax from the hives to make candles and to patch leaks in boats, back when river transport was the only way for people here to transport their produce to markets in the district capital'.

## The MPU cooperative's honey production and marketing

A change in attitude regarding the potential of forest honey to generate income, along with a concomitant recognition of the need to manage the honey hygienically and sustainably, resulted in the honey collectors deciding to establish an organized institution. The aim of the organization was to manage the collection of honey and the natural resources upon which it depended; previously this was done primarily by middlemen.

Following a number of community discussions, on 27 May 2015 members of the communities in four villages in Uluiwoi—Tawanga, Undolo, Lalombai and Sanggona—formally decided to found the MPU cooperative. It was driven by a number of honey collectors who had taken part in an AgFor Sulawesi initiative focused on the management of the forest honey.

In its first year, the cooperative was active for one harvest season only but managed to produce a total volume of around 500 kilograms. The cooperative marketed the honey not just throughout Southeast Sulawesi but also elsewhere in Indonesia and even abroad.

During this first year, approximately 100 kilograms of honey was sold to markets in Makassar, Bogor, Jakarta and Tangerang. The cooperative focused on developing markets in these areas to ensure a sustainable income, product quality, and the creation of local, national and international networks.

## Ensuring the purity of forest honey

The AgFor Sulawesi team had provided training and guidance to members of the community in Uluiwoi since 2013, focusing on the hygienic and sustainable collection of the honey. In February 2014,

Konaweha river in Uluiwoi sub-district, Kolaka Timur district, Southeast Sulawesi province. Photo by: ICRAF/La Ode Ali Said


Kusman, one of the honey farmers from Tawanga village, presenting the local honey that has been nicely packed. Photo by: ICRAF/ Christine Mailoa

the training activities were expanded to include marketing and business skills.

One of the honey collectors, Kusman, said that, 'Before we participated in the AgFor initiative, we used traditional methods to harvest the honey. We squeezed the hive with our hands to squeeze out the honey, which meant that the honey was mixed with wax, pollen and other residues. We then put it in empty water bottles to sell. During the harvest season, we sold it for around IDR20,000 to IDR30,000 [±USD1.50–2.25 at November 2016 rate] per kilogram'.

The AgFor team conducted a number of other activities to empower the village community, including institutional and community capacity building, and training in marketing and business skills. This training was intended to improve the management of natural resources by making participants aware of the importance of environmental conservation and the sustainable use of these resources.

After the AgFor team introduced techniques for sustainable use, the harvesting process changed. It now involved the collector making a cut in the hive with a stainless steel knife. Following this, the honey was filtered through a nylon cloth filter. The equipment required for the harvesting process included protective clothing, mask and headdress.

The use of sustainable harvesting techniques resulted in significant increases in the value of the honey, with the price of one kilogram increasing to around IDR50,000–55,000 [±USD3.75–4.15] in the harvest season. To maintain product quality, since the establishment of the cooperative a number of its managers have been involved in monitoring production to ensure purity.

## Distribution channels for the honey

A number of significant constraints continue to affect the sales channels for honey from the village of Tawanga. The poor communications and road infrastructure, with limited access to public transport, result in high transportation costs for farmers taking their produce to the provincial capital for sale. In addition, there are limited facilities for sending honey from Kendari to other provinces, with the cost of sending a single kilogram of honey to Jakarta ranging IDR27,000–33,000 [±USD2–2.50], which significantly increases the sale price. The cost of sending the honey to markets overseas is even higher.

A number of factors have constrained the local government's ability to improve the infrastructure. If it was improved, this would significantly reduce the production and distribution costs for a wide range of agricultural commodities, including forest honey. Managers of the cooperative hope to be able to identify transportation services that offer reduced charges to make the price of the honey produced by MPU more competitive, enabling its distribution throughout Indonesia and facilitating the penetration of international markets. ■

# Collaborative forest conservation: Nipa-Nipa Grand Forest Park

*Authors: Rustam BR, Hasantoha Adnan, Jhon Roy Sirait*

The Nipa-Nipa Grand Forest Park was established under of the Ministry of Forestry Decision No. 103/KPTS-II/1999 of 1 March 1999. Previously, the area was known as Tahura Murhum. Nipa-Nipa covers 7877 hectares across the boundaries of two districts: Konawe (5574 hectares) and the municipality of Kendari (2302 hectares).

The establishment of Nipa-Nipa was the result of an extended process, marked by conflict between communities in surrounding areas and local government agencies dating back to 1974. A number of initiatives had tried to resolve the conflict but had failed. The cause of the conflict was that the government wanted to restrict communities' access to the forest whereas farmers wanted to engage in agricultural activities in the Park. From 2001 to 2007, as a result of facilitation provided by LEPMIL, a local NGO, 17 Forest Conservation Farmers' Groups were granted responsibility for management of 525 hectares in a specially-designated zone within the Park under District Regulation No. 5/2007 concerning the management of Nipa-Nipa. These farmers' groups consisted of 1030 heads of households.

District Regulation No. 5/2007 established a collaborative mechanism for the management of the special zone. However, it did not establish a mechanism for an agreement between the


Participants of the reflection workshop in Nipa-Nipa Grand Forest Park, 5 June 2014. Photo by: World Agroforestry Centre (ICRAF)

farmers' groups and the Board of Management of the Park, which had responsibility for issuing permits to manage land. A number of constraints prevented the establishment of such mechanisms, including the lack of a legal basis to enable members of surrounding communities to use resources within the conservation zone. In addition, there were no regulations defining the nature and scope of collaborative activities. The Board had not developed any strategies to allow the use of resources within the conservation zone by the farmers' groups.

Despite these constraints, the farmers' groups were already managing land within the zone, cultivating plants of economic value, such as cloves, cashew and a range of fruit species, which generated incomes for the farmers. In addition, a number of other activities were conducted within the zone, including white-water rafting, hiking, mountain biking and the extraction of drinking water. Recently, the Ministry of Forestry promulgated new regulations related to the management of eco-tourism services, environmental water services and the establishment of a conservation forest management unit.

In 2012, the AgFor team, facilitated a process to form an agreement between the farmers' groups and managers that used 'nasi bambu' as its symbol. *Nasi bambu* is a dish characteristic of Southeast Sulawesi, which involves cooking rice in a section of bamboo. Heat is carefully applied to the bamboo so that the rice is evenly cooked. This symbolized facilitation provided to multiple parties rather than any one single entity.

The process of formulating the agreement was lengthy, commencing with a baseline study to identify all interested parties, followed by capacity-building activities both for the farmers' groups and staff of Nipa-Nipa. Komunitas Teras NGO and the AgFor team conducted a rapid assessment of the institutional capacities of the 17 farmers' groups. From this assessment, it was determined that only four of the groups had clearly defined institutional structures, with clear management and membership structures, programs and activities: Tumbuh Subur, Subur Makmur, Medudulu and Pokadulu Dua. In addition, the AgFor team conducted a strengths, weaknesses, opportunities and threats analysis of community potential to develop tree nurseries. Following these processes, the four farmers' groups were provided with guidance to develop a land management model aimed at both environmental conservation and improving community welfare.

When everyone was ready, the AgFor team initiated the process by establishing a Mutual Management Working Group for Nipa-Nipa in May 2015. The membership consisted of staff of Nipa-Nipa's Board and representatives of the four farmers' groups and Komunitas Teras. The working group first created a vision and mission statement for the management of Nipa-Nipa. According to Rustam BR, the head of development and protection unit, Nipa-Nipa Grand Forest Park, the working group was instrumental in transforming the negative perceptions held by Nipa-Nipa's Board about the farmers' groups. The Board swiftly adopted a positive view of their involvement, creating a sound base for further collaboration. Following this, the working group, including representatives of the four farmers' groups, mapped the zone's natural resources that could be used by farmers. This was used to create a management plan and agreement regarding the types of plants that could be cultivated in the zone under the management of the farmers' groups. A workshop was also conducted on management of conflict over the use of natural resources, which included a comparative study trip to the Gunung Halimun Salak National Park in Bogor, West Java.
In addition to capacity-building activities, measures were put in place to improve the regulatory environment. This began with a workshop involving a range of different groups in June 2014 that emphasized the importance of collaboration in the management of Nipa-Nipa and in the creation of strategies,

Signing of the Memorandum of Understanding between farmers and management team of Nipa-Nipa Grand Forest Park. Photo by: World Agroforestry Centre (ICRAF)

Signing of the Memorandum of Understanding between farmers and management team of Nipa-Nipa Grand Forest Park. Photo by: World Agroforestry Centre (ICRAF)

activities and programs. Following this workshop, Provincial Regulation No. 5/2007 was revised after public consultation and research, with these revisions expressed in the promulgation of District Regulation No. 6/2014 in September 2014. This regulation provided a legal ground for the collaborative management of Nipa-Nipa through partnerships to use forest land. In order to make this regulation operational, the Nipa-Nipa Long-Term Management Plan was established in October 2014, together with a Zone Planning and Rehabilitation Plan.

Following the promulgation of the regulation, on 22 June 2016, a memorandum of understanding was signed by the Board of Nipa-Nipa and representatives of the Forest Conservation Farmers' Group Subur Makmur Kelurahan Watuwatu.

Agroforestry techniques will be used by the farmers' group to support conservation while also increasing productivity. Management of the zone has several emphases.

1) Management that promotes the conservation of land and other natural resources.
2) Planting of MPTS (Multi Purpose Tree Species) plants, particularly non-commercial tree species.
3) Management of commodities' species unique to Nipa-Nipa.
4) Planting of shade trees on open land.
5) Agroforestry to facilitate the conservation of land resources.
6) Non-timber forest products.

At the signing of the MoU between the Board and the farmers' group, Ir Wiratno MSc, director of Social Forestry at the Ministry of Environment and Forestry, said that, 'This initiative serves as an example of how social forestry systems can be implemented in conservation areas not just as a means of resolving conflict but also to facilitate the conservation of the forest and to improve the socio-economic circumstances of members of communities in surrounding areas'.

# Sharing knowledge, improving life: a farmer's success story in Lawonua village

*By Hendra Gunawan*

Lawonua Village in Southeast Sulawesi's Konawe District is located strategically downstream on the long and wide Konaweha River, amidst forests and oil-palm plantations. The population consists of indigenous Tolaki and migrant Makassar and Bugis peoples. This co-existence of natives and migrants affects all aspects of life in Lawonua: from livelihoods to political development.

Most villagers are farmers and the majority are involved in pepper cultivation. Pepper was re-introduced to Lawonua in 2012, when the AgFor project and the village collaborated to host nursery management and farm demonstration plots. Before this, fruit-tree nurseries and pepper cultivation were rare in the district.

AgFor invited Dyah Manohara, a pepper expert from the Research Institute for Spices and Medicinal Plants, to a field school where farmers learned how to multiply pepper cuttings. Later, the AgFor

Sharing knowledge and good practice between farmers on organic fertilizers in Onembute village. Photo by: World Agroforestry Centre (ICRAF)

Agus's mixed crop plantation, with pepper and other commodities in Onembute village, Southeast Sulawesi province. Photo by: World Agroforestry Centre (ICRAF)

team helped them to put the knowledge into practice. The school also produced farmer extension workers, chosen from the most active and skilled participants.

'We did not really understand how to cultivate pepper before', said Agus, one of the farmers selected to train others in neighbouring villages. 'AgFor's activities and mentoring really opened our eyes and we are producing more quality seeds, for pepper as well as for other plants. New knowledge on how to produce organic fertilizer has helped us increase our farm yields significantly'.

Agus's pepper farm has changed during the four years of his involvement with AgFor. Everything is more organized and his pepper is grown more methodically. Wanting his neighbours to achieve similar success, he offered his land as an example of good farm management. 'My greatest challenge is changing the mindset of those who are still not managing their farms intensively', he said.

It seems that Agus's efforts are starting to bear fruit. His demonstration plot and his hard work developing his farm are drawing ever more attention from neighbouring farmers as they seek to copy his success. He is eager to share his knowledge and tries to stimulate a business instinct by encouraging farmers to sell their products and gain financial independence.

Agus and some of his colleagues now routinely instruct other farmers who want to learn about the cultivation of pepper and other agroforestry species he has studied in his time participating in AgFor.
'Many want to learn about segment cuttings or how to prevent pests on their farms', he said. 'Every day, five-to-ten farmers from the original AgFor farmers' group in Lawonua are helping to set up family nurseries around the area'.

His nursery attracts many buyers from across the region, who come looking for what is now known as 'AgFor pepper'.


Agus selling commodities from his home-garden production. Photo by: World Agroforestry Centre (ICRAF)

# Success Stories from Gorontalo

# Cempaka compost production facility: connecting farmers with buyers

*Author: M. Iqbal and Amy Lumban Gaol*

Cempaka compost production facility. Photo by: World Agroforestry Centre (ICRAF)

To assist the District Government of Boalemo to achieve the goals of the One Million Cocoa Plants Movement, AgFor Sulawesi signed a memorandum of understanding with the government on 5 November 2014. Under the MoU, AgFor began by establishing the Cempaka Farmers' Group in the village of Batumoito. Through this group, the AgFor Sulawesi team aimed to improve farmers' welfare by encouraging them to implement agroforestry and sustainable forestry management systems. The initiative was intended to raise the level of productivity of a number of crops through training, capacity building, sharing information about agroforestry, and implementation of agroforestry-based community empowerment.

The village of Batumoito includes the hamlet of Mebongo, where activities were held to build farmers' capacities to manage natural and agricultural resources. Many farmers in the hamlet took part, sharing technical information, producing and caring for seedlings using innovative vegetative and generative techniques, improving farm management and establishing farmers' organizations. The Cempaka Farmers' Group consists of 25 farmers, of whom 15 are men and 10 women, under the leadership of Zainudin Iyabu, the village head.

In 2015, the AgFor team provided training on production of organic fertilizer and assisted with constructing a simple compost production facility, using building materials readily available in the village and farms, including bamboo and plaited leaves for the construction of the building and animal manure and banana leaves and trunks as raw material for the production of fertilizer.

During the first stage, the facility produced 70 sacks of compost, weighing 40 kilograms each. During the second stage, this increased to 83 sacks, with the compost sold to buyers at IDR1500 [±USD0.11 at November 2016] per kilogram. Markets for this compost were farmers in surrounding villages, including Rumbia and Hutamonu in Batumoito sub-district and the Dulupi in the sub-district of the same name. A number of government agencies also ordered compost. Now, the group generates net profits of around IDR500,000 [±USD38] or even higher from a single production run. Zainudin Iyabu and his fellow farmers are amazed at what they have been able to achieve.

As well as assisting with the construction of the facility, the AgFor team also provided training in how to improve the cultivation of crops such as nutmeg, cloves, durian, coffee, *lengkeng* (lychee) and mangosteen. With all members of the group committed to studying and working hard, they also successfully established seedling production facilities. At the beginning of 2016, almost all members of the group owned and operated their own individual seedling facilities.

Working together to build a simple compost production facility. Photo by: ICRAF/M. Iqbal

The hard work, commitment and high levels of productivity of the group attracted the attention of the District Government of Boalemo's Farming and Plantations Agency.

The head of the agency, Handriyadi, stated that, 'The systems of land management and the manner in which the group uses agricultural waste and manure has played a major role in improving farmers' incomes. I sincerely hope that these activities will continue and that they will serve as an example to be implemented in other villages and even other districts'.

The Farming and Plantations Agency has provided support to the Cempaka community and its farming group by deploying a number of sub-district field staff to help the community to receive official support from the government. These endeavours have yielded positive results. With the support of the Agency, the farmers' group received assistance from the national agriculture ministry through the Organic Fertilizer Management Unit *(Unit Pengelolaan Pupuk Organik)* program throughout 2015. Together with other recipients of this program in four sub-districts of Boalemo, the farmers' group was given with support to develop a permanent compost production facility, with an organic grass-grinding machine, sheds to raise 10 cattle, and a three-wheeled motorized vehicle.

Farmers' activity in compost production facility. Photo by: ICRAF/M. Iqbal

Funds for these facilities were disbursed in January 2016. The construction of the permanent production facility was implemented in stages. With their expanded knowledge of seedling production, farming techniques, land management, and agroforestry techniques that involve the integration of a range of food and other crops, the Cempaka Farmers' Group now collectively owns 57 cocoa, 65 nutmeg, 62 pepper and 65 clove trees.

'Now all members of my group have great permanent facilities to produce seedlings. We're going to strive to keep on learning how to produce seedlings for our own use and for sale', said Iyabu. 'We would like to express our deepest gratitude and appreciation to the Farming and Plantations Agency of the District of Boalemo and to the AgFor team. With their help, we have managed to transform our simple initiative into something truly extraordinary'. ■

# Developing partnerships between farmers and seed producers in Gorontalo

*Authors: Awaluddin, Sahabuddin, Paharuddin, Hamsir, Duman Wau*

The district governments of Gorontalo and Boalemo have formulated policies to facilitate a shift from a monocultural system of agriculture with maize as the sole crop to agroforestry systems involving the cultivation of a diverse range of annual and perennial crops. The intention is that these policies will establish a framework for the development of agroforestry systems that can be applied on land managed by farmers in these districts. A number of related policies have been implemented through various programs, such as One Million Cocoa Trees *(Sejuta Kakao)* by the District Government of Boalemo, and Integrated Commodities and Horticulture and Agro-tourism Zone *(Pewilayahan Komoditas dan Pengembangan Kawasan Agrowisata dan Hortikultura Terpadu)* by the District Government of Gorontalo.

These programs have resulted in a significant increase in the level of demand for seed stock and seedlings for the commodities they target. In the district of Boalemo in 2017, the strongest demand was for cocoa, clove and nutmeg seed stock and seedlings, with a need for 400,000 cocoa, 60,000 clove and 30,000 nutmeg seedlings. In the district of Gorontalo, the strongest demand was for cloves, nutmeg and pepper seed stock and seedlings: 200,000, 50,000 and 50,000, respectively. These figures do not include the demand for seedlings for fruit species that will be developed in the integrated horticulture and agro-tourism zone, such as durian, jackfruit, mangosteen and a number of others. However, the demand for seedlings is relatively low, considering the extent of available land for further development. The demand for high-quality seedlings is expected to continue to grow exponentially in the future.

Arman Ibura's cacao nursery in Bendungan village, Boalemo district. Photo by: ICRAF/Hamsir

Over the past several years, seedlings have been procured from outside Gorontalo, with cocoa and pepper seedlings sourced from Central Sulawesi, nutmeg from North Sulawesi and Maluku, and fruit tree seedlings from a number of other areas, including from as far away as Java. This state of affairs indicates that there is excellent potential for the development of seedling and seed stock production facilities in the province of Gorontalo itself.

However, a number of regulations restricting the planting and sale of seedlings and seed stock acts as a constraint on expansion, with planting and sales activities required to conform to these regulations. For example, regulations governing the certification of seed stock state that the source of all seeds must be clearly and explicitly declared. The establishment of businesses to meet the growing demand for seedlings and seed stock requires not just the appropriate technical skills to produce them, it also requires an extensive knowledge of the regulatory environment. This acts as a significant constraint on farmers or smaller propagators' involvement in the production of seed stock required to produce agricultural commodities.

To address this, the AgFor Sulawesi team has provided facilitation to 22 farmers' groups in two districts, Gorontalo and Boalemo, to enable them to engage in the production of seed stock. Almost all of the participants in these activities now have the capacities and technical skills required to cultivate, maintain and produce seed stock for a wide range of commodities. These commodities include cloves, nutmeg, cocoa, pepper, durian, rambutan and jackfruit. Most of the seeds produced by these groups have been proven to be of good quality, producing healthy crops on the farms of participating farmers.

A number of farmers have expressed an interest in establishing their own individual seedling businesses, with a large number of farmers now conducting their own seedling production activities on their own premises. Their ultimate goal is not just to meet their own needs but to produce enough for sale to other farmers who have not yet acquired the necessary skills to produce their own stock.
A number of groups have attempted to market their seedlings, which has raised awareness of farmers in the districts regarding the potential economic value of producing seed stock. The Delita group, in the village of Botumoputi, successfully sold 500 jackfruit seedlings to a private business, CV Mitra Tani. Later, the Huyula group, in the village of Botumoito, sold 150 nutmeg seedlings to the same purchaser. Similarly, the Modelidu Lestari group also sold jackfruit seedlings to another purchaser, Forest Modelidu, in the district of Gorontalo.

These small-scale sales have raised awareness among group members

that the seedlings they produce can be used not only to meet their own needs for seedlings but also to generate additional income. The AgFor Sulawesi team is aware that farmers' recognition of this potential plays an important role in ensuring the sustainability of the production of seedlings in the district, with farmers increasingly aware that such businesses have the potential for further expansion and for additional income generation. The process began with expanding participants' level of knowledge and skills, with the activity then becoming a hobby and finally a source of income with excellent potential for further development. It is hoped that this evolution in the farmers' level of awareness will ensure the sustainability of the initiative in the long term.

As is appropriate for emerging small-scale businesses, those operating small-scale propagation and seedling facilities are actively encouraged to engage in partnerships with more established, larger-scale operations throughout Gorontalo. There are a number of such larger, well-established firms in the districts of Gorontalo and Boalemo, such as CV Mitra Tani, CV Puncak Mekar, CV Fresia Utama, Forest Modelidu and a number of individually-owned operations.

However, a number of these established seedling production firms focus specifically on the production of seedlings of timber-bearing trees for the purpose of forestry or reforestation activities, such as mahogany, teak, *Gamelina, Agatis,* 'lamtoro' and 'nyato', with only three large operations focusing specifically on agricultural commodities, such as cloves, cocoa, nutmeg and a range of fruit trees: CV Mitra Tani, CV Puncak Mekar and CV Fresia Utama.

Despite their extensive experience in the area of seedling production, these large operators continue to face a number of constraints, including limited land and availability of skilled labour, with this affecting their ability to meet the high level of demand. As a result, they are compelled to engage in cooperative endeavours and partnerships, often sourcing seedlings from outside the province if supplies are inadequate.

The large-scale operators therefore welcomed AgFor Sulawesi's initiative to develop the capacities of individual farmers and farming groups to participate in the production of seedlings and seed stock. These operators are prepared to provide assistance and engage in cooperative efforts to develop the farmers' businesses, including through the establishment of cooperative arrangements to market their output and to provide technical assistance. They are motivated to engage in these cooperative endeavours to overcome their individual limitations in terms of meeting the demand for high volumes of seedlings and seed stock, particularly in the context of the limited availability of land and the high costs associated with acquiring new land to expand their operations. The establishment of cooperative relationships enables these operators to maintain stock levels and to source labour and land for their operations. On the other hand, the participating farmers benefit from the larger operators' capacities in terms of marketing, guaranteed prices and orders, access to certified seeds, and access to the required production facilities.

In the sub-district of Paguat, located on the border between the districts of Boalemo and Pohuwatu, CV Fresia Utama has been selected to engage in a cooperative endeavour with those farming groups participating in AgFor's initiatives. Farmers who are part of AgFor in the district of Gorontalo are engaging in a similar endeavour with CV Puncak Mekar, which is based in the sub-district of Limboto, Gorontalo.

**Arman Ibura's cacao seedlings in Bendungan village, Boalemo district. Photo by: ICRAF/ Hamsir**

These partnerships have been formulated through a memorandum of understanding (MoU) between the farming groups and the large firms. This MoU clearly defines the rights and obligations of the respective parties, defining guaranteed purchases, prices and the cooperative model. It is hoped that this cooperative endeavour will serve as a good first step towards the development of seedling production businesses by participating farmers, enabling them to acquire business skills, to develop their technical skills, and to better understand practices related to the distribution and marketing of seed stock, the process of tendering, and the regulatory environment governing the propagation of seedlings. The development of these partnerships offers great hope for the future. In the next few years, it is hoped that the participating farmers who have already established small-scale businesses will successfully expand, enabling them to provide employment, generate livelihoods, and improve the socio-economic circumstances of the community. At the same time, it is hoped that they will play a significant role in meeting the demand for high-quality, certified seed stock in the district. Thus, it is hoped that they will be able to make a significant contribution to the achievement of the goals of local government programs, such as the One Million Cocoa Trees program and the Integrated Commodities and Horticulture and Agro-tourism Zone program. ■


Kota Gorontalo's district head, Prof Dr Ir H. Nelson Pomalingo, MPd, planting a bamboo tree in Tangale Nature Reserve. Photo by: ICRAF/Dewi Biahimo

# Preserving bamboo in the Tangale Nature Reserve

*Author: Sri Dewi Biahimo*

The Tangale Nature Reserve *(Cagar Alam Tangale)* is a small reserve located between the villages of Buhu and Labanu in Tibawa sub-district, Gorontalo district. According to the reserve's chief manager, Kisman Yusuf, encroachment is common by villagers foraging for bamboo, which they use to make plaited sheets for housing and to produce a traditional dish known as 'nasi buluh' or 'nasi jaha'. This dish involves cooking rice in a portion of the trunk of a bamboo species found in the Reserve. Fadli Otuhu, the village head in Labanu, adds that it has now become extremely difficult to source the species of yellow bamboo that is used for traditional ceremonies in the Gorontalo area. Because of its scarcity, community members now use green bamboo, which they paint yellow for ceremonies. If they insist on using real yellow bamboo, they must pay a high price or forage for it in the Reserve. If they are caught, they risk being arrested and sanctioned according to the law.

Ramsi Toyili, a community leader from the village of Mootilango, which neighbours Labanu, stated that he and other members of the community have derived significant benefits from planting bamboo in their fields and yards. In addition to providing a source of construction material, these bamboo also play a valuable role in preserving water resources, even in the case of the extended dry seasons that are a frequent occurrence in the area. Toyili was one of a number of participants in an initiative conducted by AgFor Sulawesi in Gorontalo, 3–5 June 2016, to train people in how to plant and use bamboo for a range of diverse products.

The AgFor team conducted environmental initiatives in the four villages of Mootilango, Labanu, Buhu and Mootilango. These villages were selected because of their strategic location in areas with high-value biodiversity in the Alo River Watershed. The area contains a wide range of species of flora and fauna but also features high levels of environmental degradation that contribute significantly to the increasing sedimentation of Lake Limboto.

The training was conducted over an extended period. In Gorontalo, the AgFor team began with a vulnerability study and a Strengths, Weaknesses, Opportunities and Threats analysis of the four villages, followed by establishing a working group made up of representatives of the villages, government agencies, Watershed Control Board *(Balai Pengendalian Daerah Aliran Sungai/ BPDAS)*, Natural Resources Conservation Board *(Balai Konservasi Sumber Daya Alam)* and local NGOs. This group's role was to formulate

strategies for environmentally-sustainable livelihoods and to manage land resources in and around the Tangale Nature Reserve, which forms part of the upstream area of the Alopohu Watershed. After the strategy was created, the AgFor team trained members of the group and the broader community in how to monitor hydrology and biodiversity and map critically-affected land for reforestation.

To ensure the sustainability of the program to manage critically-affected land, an agreement was established between community representatives from the four villages; BPDAS, as a supplier of seed stock; and the regional development planning agency *(Badan Perencanaan Pembangunan Daerah)*, as the representative of the District Government of Gorontalo. The map of critically-affected land prepared by the AgFor team, working group and members of the community served as the guideline for prioritization of areas for reforestation.

Following this agreement, the AgFor team worked with local government agencies to build community capacities through training in the four villages, beginning with a festival to celebrate and promote bamboo. The communities learned how to identify a range of different species of bamboo and how they could be used, along with techniques for planting and managing them. As part of the training, the District Head of Gorontalo, Prof Dr Nelson Pomalingo MPd, took part in a bamboo-planting ceremony on the banks of the Alo River, which borders the Tangale Nature Reserve.

'As a child, I spent a lot of time in Tangale', he said. 'I want us all to work together to restore it to its former green state. I urge village heads and all members of the community taking part in this training to strive to protect the bamboo forests and to ensure their sustainability. To facilitate this, we will hold a bamboo festival each year, with local government support.

**Coordinator of AgFor project in Gorontalo province, Duman Wau, and his team having a discussion with Prof Dr Ir H. Nelson Pomalingo, MPd regarding bamboo trees' preservation in Tangale Nature Reserve. Photo by: World Agroforestry Centre (ICRAF)**

I hope that all members of the community taking part in AgFor's activities today will engage with others throughout the district, demonstrating the techniques and means of planting and cultivating bamboo so that we no longer need to bring in experts from outside the province to train us. Everyone who has taken part in this initiative should serve as trainers'.

With the high level of commitment of the participants to preserve bamboo and the support of the local government, this initiative represents an initial step towards raising the community's awareness of the importance for their lives and livelihoods of environmental conservation within the Reserve and surrounding areas. The AgFor team has established an effective mechanism by which the community can now identify critical areas for planting with bamboo seedlings provided by BPDAS.

In addition, the District Government of Gorontalo has categorized the sub-district of Tibawa as a water reserve area and Tangale as a natural conservation area in its District Spatial and Land-use Plan *(Rancangan Peraturan Daerah Rencana Tata Ruang dan Tata Wilayah)*.

'I am certain that bamboo will play a valuable role in facilitating the reforestation of Tangale and surrounding areas, providing a source of livelihoods and mitigating against the negative impacts of the frequent floods and landslides in the area', Pomalingo concluded. ■

Figure1. Agustin Mercado Jr providing technical guidance on newly-created natural vegetative strips in August 2016. Photo by: ICRAF/Nurain Lapolo

# Minimising the negative impact of erosion: contouring land and agroforestry

*Duman Wau and Sahabuddin Hamid*

Over the course of a year, the hilly areas around Gorontalo constantly change colour, according to the stage of growth of the dominant monocultural crop: maize. The hills are green during the planting and early growth stages then brown and yellow during the harvest season. When the land is cleared for the next planting, the hills are completely bare, without any vegetation at all. While the changing colours are indeed very pretty, they are also indicative of serious ecological, economic and social dangers.

Around 60% of Gorontalo's land resources consist of hilly areas, which means that farmers often cultivate crops on steep terrain, with maize dominant. Cultivation of maize requires strong sunlight; other plants that consume and store water are considered detrimental to its growth and are removed. As a result, while there is a drastic reduction in the volume of the water debit in the dry season, in the rainy season there is massive erosion resulting in an extremely high level of sedimentation in the rivers.

The detrimental effects of the erosion also extend beyond the rivers. According to research conducted by Agustin Mercado of the World Agroforestry Centre in the Philippines, land in that country, which has a similar topography to Gorontalo, can lose topsoil ranging 50–300 tons per hectare per year. Associated economic losses have been calculated at IDR3—18 million [± USD227–1365 at November 2016] per hectare per year owing to reduced soil fertility that requires farmers to use expensive chemical fertilizers. The heavy use of chemical fertilisers and pesticides results in the accumulation of chemical residues, which

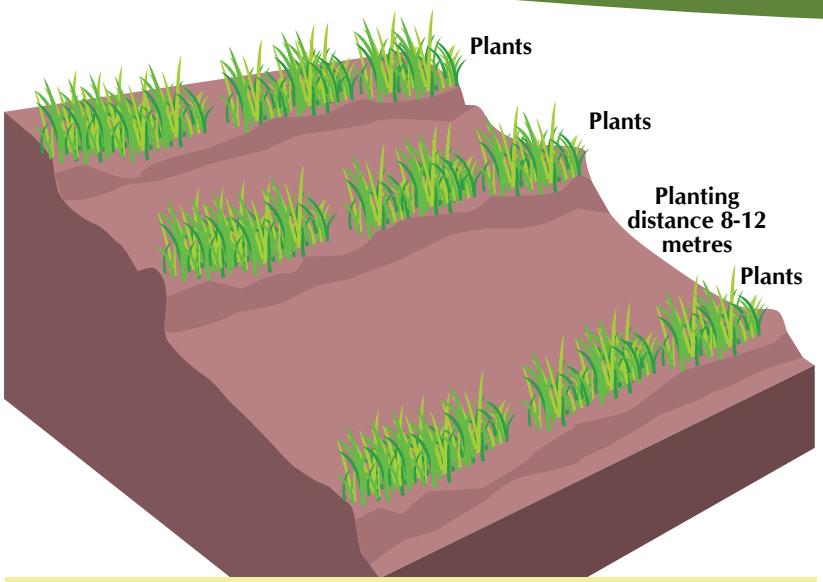



Figure 2. Natural vegetative strips can be used to produce terraced land (adapted from https://qt.wocat.net/qt_summary.php?lang=english&qt_id=292)

enter the groundwater and waterways, leading to a significant decline in water quality in surrounding areas.

The high level of erosion in Gorontalo has also been identified through research conducted by BPDAS and Sri Legowo in 2010: in the area around Lake Limboto, erosion ranges 45–108 tons per hectare per year. This threatens the very existence of the lake, with a real possibility that it will be transformed into a dry plain as a result of silting. High erosion is also affecting fertility in the areas surrounding Gorontalo. As a consequence of the decline of soil fertility that renders land unsuitable for conventional agriculture, an increasing amount of forests are being cleared and converted to agricultural land because such land is relatively more fertile. Without substantial changes to this behaviour, a major ecological—and agricultural—disaster is looming.

Hadjara Saipi, a farmer participating in the AgFor program, described the ecological changes that she has witnessed over the past several years: 'The area around here didn't used to be so dry. The changes have occurred only recently. In the rainy season, now it only rains for several hours. Yet at the same time, the rivers are spilling over their banks, with the water a dark, chocolate colour. My plot of land is near the river. When it flooded, I lost 100 pepper and chilli plants in a single season. In more than 30 years, I've never experienced anything like that'.

In economic terms, farmers growing maize monoculture can harvest one crop every 3 to 4 months yet this is not sufficient to enable them to rise out of poverty. One farmer in Boalemo, Zainuddin, declared emphatically that he is now increasingly reluctant to grow maize for economic reasons alone, using as an example the religious requirement to make the pilgrimage to Meccah, which is an expensive undertaking.

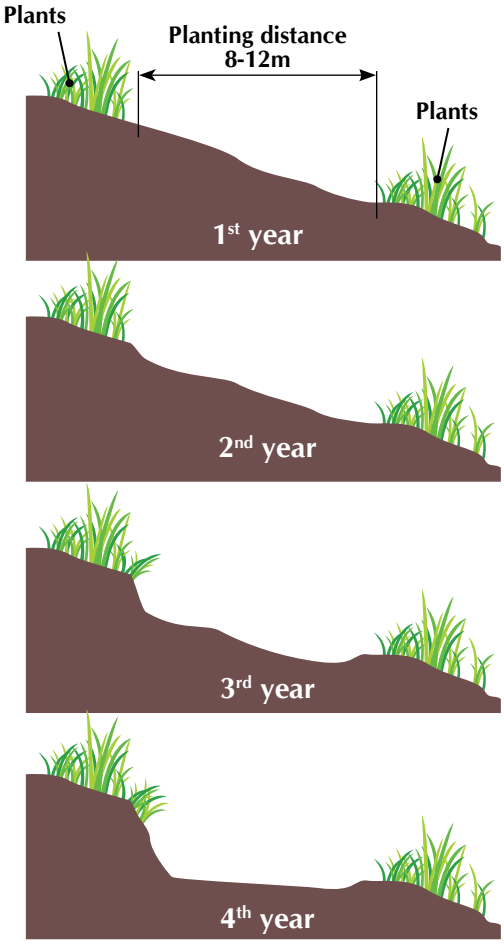
'In the whole of Gorontalo, there isn't a single maize farmer who has earned enough to go on the Hajj, that's for sure'.

Even in a normal season, the income generated from the cultivation of this crop is barely enough to meet a farmer's basic needs thanks to frequent crop failures at the planting and harvesting stages because of extended dry seasons, an impact of climate change. As a result, farmers experience frequent losses, resulting in an increasing incidence of social tension and other problems. In many cases, those previously deriving a livelihood from agriculture have been compelled to seek work as labourers on mine sites.

## Terraced agriculture can reduce the negative impact of erosion

Erosion and its negative effects have been experienced in many other areas in addition to Gorontalo. Yet in Indonesia, the practice of terraced agriculture has an extensive history. This form of agriculture has been designed to conserve land and water resources on steep land. Terraced rice farming is extensively practised in Bali, Java and a number of other areas in Indonesia, with the terraces built in the past by manual labour. Recently, oil-palm plantations have used heavy machinery to construct terraces. Whether by hand or with machines, creating terraces is an expensive business, which acts as a constraint to small-scale farmers with land of only 1–2 hectares, low incomes and shortages of labour.

So it is essential to identify cheaper alternatives to terraced agriculture that can mitigate




the impact of erosion. In the Philippines since the 1970s, a system of agriculture has been practised called Sloping Agricultural Land Technology (SALT) or Natural Vegetative Strips (NVS), particularly for the cultivation of maize (see figure 2). With this technique, natural vegetation that grows on contoured land is retained to prevent erosion and to maintain the fertility of the soil. This technique has been demonstrated to reduce the impact of soil erosion within three-to-five years, at a relatively low cost.

## AgFor promotes terraced agriculture using agroforestry

In Gorontalo, the AgFor team is striving to address soil erosion by implementing a number of pilot projects involving the construction of contours on the steeply-sloping land of participating farmers. These pilots commenced with training in the village of Ayuhulalo, facilitated by Agustin Mercado Jr, a researcher from the World Agroforestry Centre Philippines, who has been involved in this particular field for over 30 years. In 2015–2016, the AgFor team conducted 16 rounds of training on the NVS system around Gorontalo, involving more than 400 people. In addition to raising awareness about the benefits of this simple technique, the training involved practical implementation of the system on land belonging to participating farmers.

The training and demonstration activities were conducted in the villages of Ayuhulalo in Boalemo district and Dulamayo Selatan in Gorontalo district. As a result of these activities, the system has been applied on a significant number of agricultural plots. The construction of the contours and the planting of the vegetation along the contours takes around six months, at which point the vegetation has matured to the extent that it significantly reduces water flows that wash away topsoil.
As one farmer in Dulamayo Selatan, Wahyudi, said, 'You can see the difference when the grass is allowed to remain in the lanes: it holds the topsoil in place. Before we used this system the fields turned into deep mud after it rained but that's not the case now'.

A number of farmers in the areas surrounding the demonstration plots have already begun to implement the system on their own land.

An environmental action group based in Gorontalo, FKH, is now also implementing this innovative system. As an alternative to grass, a number of plants with economic value can be used to prevent erosion, such as lemongrass and elephant grass (*Arachis pintoii*), a type of groundcover bean.

The most significant challenge is changing the mindset of the farmers, to convince them to apply these conservation practices. The AgFor team has attempted to address this through intensive facilitation, sharing technical information. In addition, the beginning of a change of mindset has been encouraged through the AgFor team's involvement with participating farmers to produce seed stock and seedlings for the farmers' priority crops. These seedlings are used to plant the contoured slopes to create an agroforestry system, with the aim being that the seedlings will grow into timber-bearing trees, which also play a major role in preventing erosion as well as providing economic and other benefits.

Innovative agroforestry systems implemented on contoured land can play a major role in mitigating the impact of erosion. The positive impact of this innovative approach indicates that it should be applied more broadly. However, this impact will only be achieved if the approach is adopted across a whole landscape rather than in a piecemeal fashion by a small proportion of farmers. To facilitate wide-scale implementation, all farmers and others with an interest in the health of the watershed must commit to promoting the adoption of agroforestry systems. ■

# AgFor, they say...

"The training and skills provided by AgFor for rural communities, building capacity, has started to show result. This has really helped us to do our homework in building and creating environmental sustainability in Bantaeng."
**Prof Dr H. M. Nurdin Abdullah, MAgr**
**Head, Bantaeng District**
**South Sulawesi Province**

"AgFor has provided good and effective assistance such as activities and programs to improve people's knowledge. All activities that have been carried out by AgFor can be integrated into our Medium-term Development Work Plan *(RPJMD)*; starting with sustainable natural resource management, water conservation, afforestation and land management with agroforestry systems."
**Prof Dr Syamsu Alam, MSi**
**Head, Department Planning Agency, Bantaeng District**
**South Sulawesi Province**

"AgFor has brought so many, many useful benefits: how to prune coffee; how to prune and graft plants correctly. Previously, our coffee harvest was only five tons [per year]. After AgFor's involvement, I produce twice as much now."
**Fatmawati**
**Farmer, Jenetallasa Village**
**South Sulawesi Province**

"Of course, we, the Agriculture and Crops of Boalemo District Government, are hoping that AgFor can stay longer and continue their good job."
**Nurdin, SP, MSi**
**Head, Agriculture and Crops, Boalemo District**
**Gorontalo Province**

"We will continue all programs that we've been working on with AgFor because we have seen the benefits for the community. We will include it in the *APBD* (district work plan and budget)."
**Ir Andi Misbawati Wawo, MHut**
**Head, Department of Forestry and Estate Crops, Bulukumba District**
**South Sulawesi Province**

In the future, Konawe might be used as a model, especially for inland farming communities or any community forestry, to implement on their land what has been developed by AgFor here."
**Muhammad Akbar, SP, MSi**
**Head, Executive Agency, Fisheries, Forestry, Agriculture and Food Security Extension *(BP4K)*, Konawe District**
**Southeast Sulawesi Province**

"The presence of AgFor has raised understanding, improved knowledge and empowered the community so that they can be independent. They have gained knowledge and worked hard to achieve maximum results that they will enjoy for themselves."
**Drs Tony Herbiansyah, MSi**
**Head, Kolaka Timur District**
**Southeast Sulawesi Province**

"We continue the capacity building for farmer extensionists that have been trained by AgFor. The commodities that have been improved by AgFor, especially pepper, are booming in Kolaka Timur District, with a high number of orders compared to other districts and provinces. The government has included this in the Medium-Term Development Plan to increase the quality of the commodities through more assistance to farmers and extension workers."
**Dr Ir Idarwati, MM**
**Head, Executive Agency for Fisheries, Forestry and Agricultural Extension, Kolaka Timur District**
**Southeast Sulawesi Province**

"The most interesting thing after the implementation of AgFor over the last 5 years is how they can reignite the enthusiasm of farmers to start managing their land and farms again after they had been abandoned and then improve their farming systems or their farm management with organic systems."
**Gusti Kusuma**
**Coordinator, Operation Wallacea Trust**
**Southeast Sulawesi Province**

"AgFor has trained and helped us to produce honey through a sustainable and hygienic process. They are also actively supporting us to promote our local honey product in other places, such as in the provincial and nationally."
**Kusman**
**Head, Mepokoaso Pasoema Uluiwoi Cooperative, Kolaka Timur District**
**Southeast Sulawesi Province**

"I have gained an increase in my income from my commodity plants. I can save more money now from my garden. My first child has a bachelor's degree in economics; the second has a bachelor's degree in public health; and the third has a bachelor's degree in English literature. I keep saving my money to buy a car."
**Hadjara Saipi**
**Farmer, Ayuhulalo Village**
**Gorontalo Province**

The active participation by AgFor has been an integral part of the successful legislative process for District Regulation No. 9/2015. AgFor has done so many things, and we have been working very closely with everyone to make this regulation a rule in which everyone has participated.
**Andi Buyung Saputra, SSTP, MM**
**Head, Kajang Sub-district, Bulukumba**
**South Sulawesi Province**

**World Agroforestry Centre (ICRAF)**
**Southeast Asia Regional Program**

Jl. CIFOR, Situ Gede, Sindang Barang
Bogor 16115, PO Box 161
Bogor 16001, Indonesia
Phone: +62 251 8625415
Fax: +62 251 8625416
E-mail: icraf-indonesia@cgiar.org
blog.worldagroforestry.org

http://www.worldagroforestry.org/region/southeast-asia

World Agroforestry Centre
Canada
CGIAR
CIFOR
OWT
Kementerian PPN/ Bappenas