ECOLOGICAL FOREST FARMS
FOR THE ENVIRONMENTAL REGENERATION OF RIVER BASINS

IDEASS CUBA

Innovation for Development and South-South Cooperation

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Introduction

Ecological forest farms represent a coherent solution to various global environmental problems. Throughout the world, deforestation, soil erosion, dwindling biodiversity, desertification, water pollution, and other forms of environmental deterioration threaten the nutritional well being of rural populations and the agricultural sustainability of river basins

Varying in size from 25 to 75 hectares, forest farms offer a feasible alternative, guaranteeing a secure supply of food, reforestation and woodland management for rural populations. To give forest farmers a broad sense of social belonging, the farms are designed as part of ecological rural development programmes and are set up with technical, economical, social and environmental aspects in mind.

The farms can also make a strategic contribution to curbing mass migration from rural to urban areas, a phenomenon that jeopardizes forest development. This is an aspect that is overlooked in many countries where a high population density is dependant on farming for socio-economic progress.

In Cuba, the Agriculture Ministry, through the GEAM (Hill-Farming Management Group), which oversees the Ecological Forest Enterprise System, the IIF (Forestry Research Institute), and the SEF (State Forestry Service), has set up 848 farms and planned another 5,000 in the medium term. In only 6 years, forest farms have been responsible for planting 13,643 hectares, a figure that represents almost 35% of the country's annual total. In regions with limited production (poor soil and/or affected by frequent droughts), a 95% survival rate has been achieved in all planted areas. This contrasts with a historical average of 36.1 % in similar circumstances when conventional methods were used. Moreover, the incidence of illegal logging and forest fires has diminished (39%). Average salaries have also gone up by an average of 17% and production by 38%.

The impact of this innovation has been greatest in the eastern region of Cuba, where people have problems securing water and food. Of the 8,573 hectares that have been planted, more than 3,000 (35%) make up a woodland belt consisting of 14 multipurpose forestry cultivars, which acts as a water regulator along the banks of the river Cauto, the largest in the country. Due to the care and attention they receive, the trees have shown greater rates of success (85%) and survival (more than 95%) compared to traditional reforestation methods. This has led to improved soil and water quality, and greater protection and shelter for wildlife.

During the Equator Initiative of the Johannesburg Summit on Sustainable Development (2002), the UNDP, the Canadian government, the International Development Research Centre and the World Conservation Union recognised ecological forest farms as one of the world's 25 most successful sustainable development projects.

What problem does it solve?

Forestry resources and the Cuban population have evolved in different ways: from 1812 to 1900 wooded areas fell from 89% to 54%, while the population rose from 0.5 to 1 million inhabitants. Rapid development of the sugar industry led to disproportionate plundering of woodland areas to supply fuel for boilers and to satisfy the basic needs of the population in terms of food and social development.

This brought a rapid breakdown in both the hydrological cycle of Cuban agriculture, and the natural cycle of land use: forest - agriculture - livestock - forest.

The soil gradually became impoverished, reforestation was hardly attempted and the agricultural frontier expanded horizontally. No ecological criteria were used to maintain soil structure and fertility, which are fundamental for sustainable production of forest and farm products.

From 1900 to 1959, the situation just got worse. Woodland dropped to 14% of the total, while the population reached 6.9 million. In this period, barely 6,000 hectares were reforested, not enough to form a permanent dynamic agricultural balance: woods – agriculture – livestock.

Now, 44 years later, in contrast to the previous situation, 21.9%, of the country is woodland, after more than 440,000 hectares have been reforested. Over the same period, the population has gone up to 11 million inhabitants. This provides a forest/population ratio of 0.22 hectares per capita, which is the amount of woodland available to every Cuban, who can thus reap the benefits of the goods and services of this extremely valuable natural resource.

While these trends in forest resources and the population were in progress, bad soil management meant that 4.9 million hectares of agricultural land and grazing areas suffered from erosion. The main problems regarded compaction, (1.4), poor moisture retention (1.1), acidity, stoniness (1.4), and salinity (1).

Water resources, too, which benefit from the regulatory, anti-erosive and protective capacities of forests, evolved over time and space. While woodland declined, capacity for storing annual surface water flow (more than 7,000 million cubic metres) was increased by constructing 241 expensive large-scale hydraulic works and more than 750 small reservoirs.

This situation underlines the importance of continuing the sustainable development provided by the ecological forest farm movement, which aims to reverse the problems of soil degradation, increase woodland areas and extend the life span of hydraulic works. Agricultural, livestock and woodland areas are all distributed in 632 river basin areas of over five square kilometres, which handle 80 % of annual water flow, an estimated 27,700 million cubic metres.

The Cuban Agriculture Ministry, through the GEAM, which oversees the Ecological Forest Enterprise System, the IIF, and the SEF, has set up 848 forest farms, with medium term plans for 5,000 more. The IIF and the network of experimental stations provide training and advice for the technical personnel of forest companies and the forest farmers, which it does through research and applied technology.

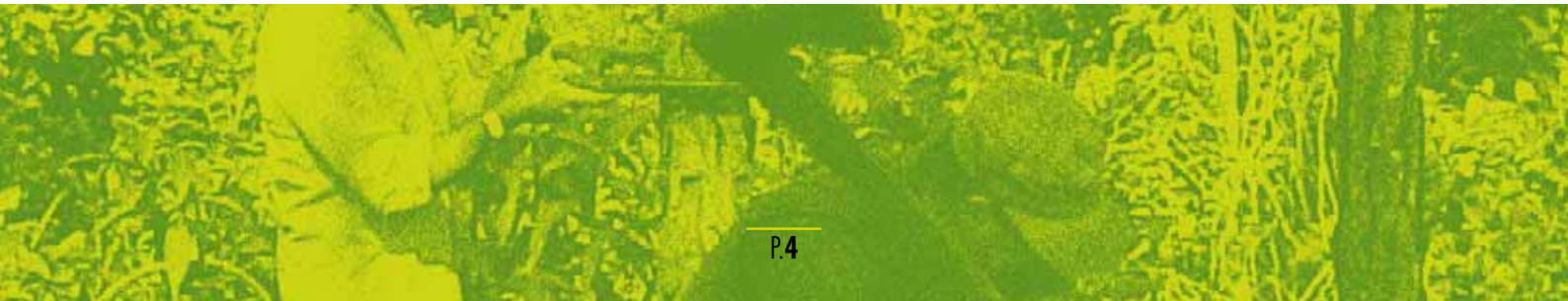
The SEF approves proposals for forest farms projects, controls and certifies success and survival rates in plantations, and allocates bonuses for forestry activities as provided for in the Forestry Law. The municipal government also takes part in this process, through commissions set up in every municipality of the country to control reforestation, protect woodland, and safeguard the environment in general.

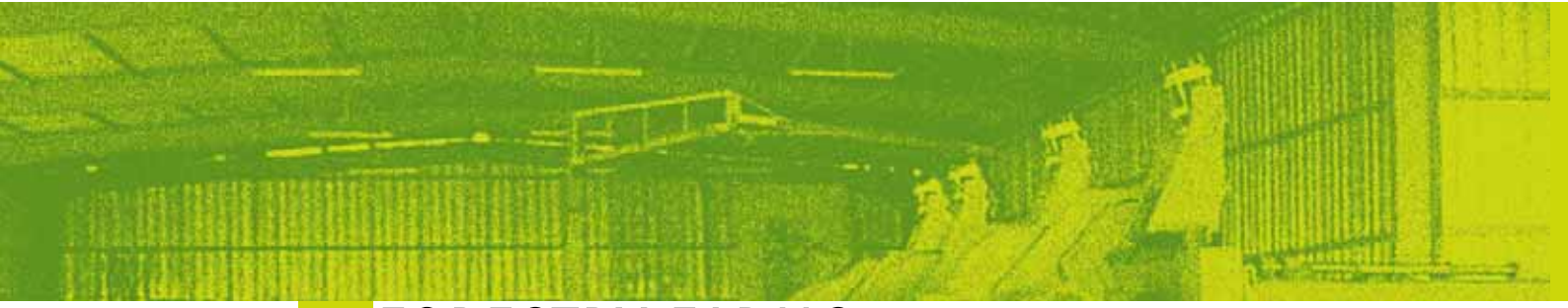
In financial terms, many farms established in unproductive lands have produced tangible results (direct wood products) and balanced budgets, taking into account reforestation activities, certification, bonuses, investment and other. After six years work in this new form of forestry organisation, farmers have made net earnings of USD 71,133.

Technically, forestry development has benefited substantially from technology developed by research activities, at both the national and international level. Capacity building programmes for technical personal and forest farmers give them the basic technological know-how for productive management. The environment, too, has gained from an increased variety of forest cultivars planted in lands that used to be deforested. Riverbanks and the margins of large reservoirs have also been rapidly reforested to protect water quality. This, moreover, has a positive effect on wildlife by increasing potential for shelter and protection.

The ecological forest farm movement has helped create living conditions that benefit family welfare and have given farmers a broad sense of social belonging. This can be seen not only in terms of productivity, but also in forest care and protection from the dangers of deliberate fires, illegal logging, disease and illness. It also encourages rural populations to stay on the land and curbs migration to cities by providing work and access to basic social services, increasing the quality of life for the people living in forest farm areas.

Although results are only just beginning to show, this novel form of forestry production and protection has been the subject of debate in various national and international events, papers and conferences, which have recognised its value and encouraged authorities to continue applying this method in all the country's forestry enterprises.





FORESTRY FARMS in practice

The ecological forest enterprise system, which was set up by a ministerial resolution, follows various stages of operation, based on the principle that the forest farmer's tenancy of the land is tied to regular production. In return, farmers are given free use of an area of between 25 and 100 hectares, with or without a wood, including some hectares for agro-forestry production to satisfy family needs.

Then, a forestry management plan is drawn up, in line with the company's overall management and organisation plans, and categorised accordingly (soil and water protection, production, etc.).

This management plan stipulates what work needs to be done over the forest farm's production cycle (tree nursery, planting, maintenance, treatments, exploitation, fire prevention). For this work the farmer is given a basic monthly wage and yearly salary. Earnings can be supplemented, depending on results, by bonuses and sale of excess agro-forestry production. An important element is that forest companies guarantee decent housing and living conditions, as well as access to basic social services, for the farmers and their families.

Areas set aside for agro-forestry production must follow the basic principle of minimum ploughing and include permanent diversified agricultural products. This is achieved by planting fruit trees, preferably grafted, and taking simple measures to preserve and improve the soil that require low input and do not affect the environment, so as to satisfy food needs sustainably and promote excess production to increase family revenue. Similarly, in deforested areas, depending on reforestation conditions, the spaces between the trees in the first years of growth can be exploited agriculturally to help finance costs.

In the case of forest livestock systems for the production of cheap milk and meat, again the basic principle applies of utilising multipurpose forest plants to provide forage, shade and windbreaks. Trees that produce fruit for livestock feed should also be planted.

Duties, rights and prohibitions are established in forest farm regulations. Farmers can join trade associations, and have a right to breaks and holidays, protection and hygienic work conditions, and systematic improvements in living standards and the work environment. They also have a right to training, as part of the company's capacity building programmes and those of other institutions concerned with the protection of the environment. Duties include implementation of management plans, safeguarding, promoting and protecting existing woodland, keeping and cleaning property and furniture. The most important prohibition stipulates that farm areas cannot be utilised by third parties.

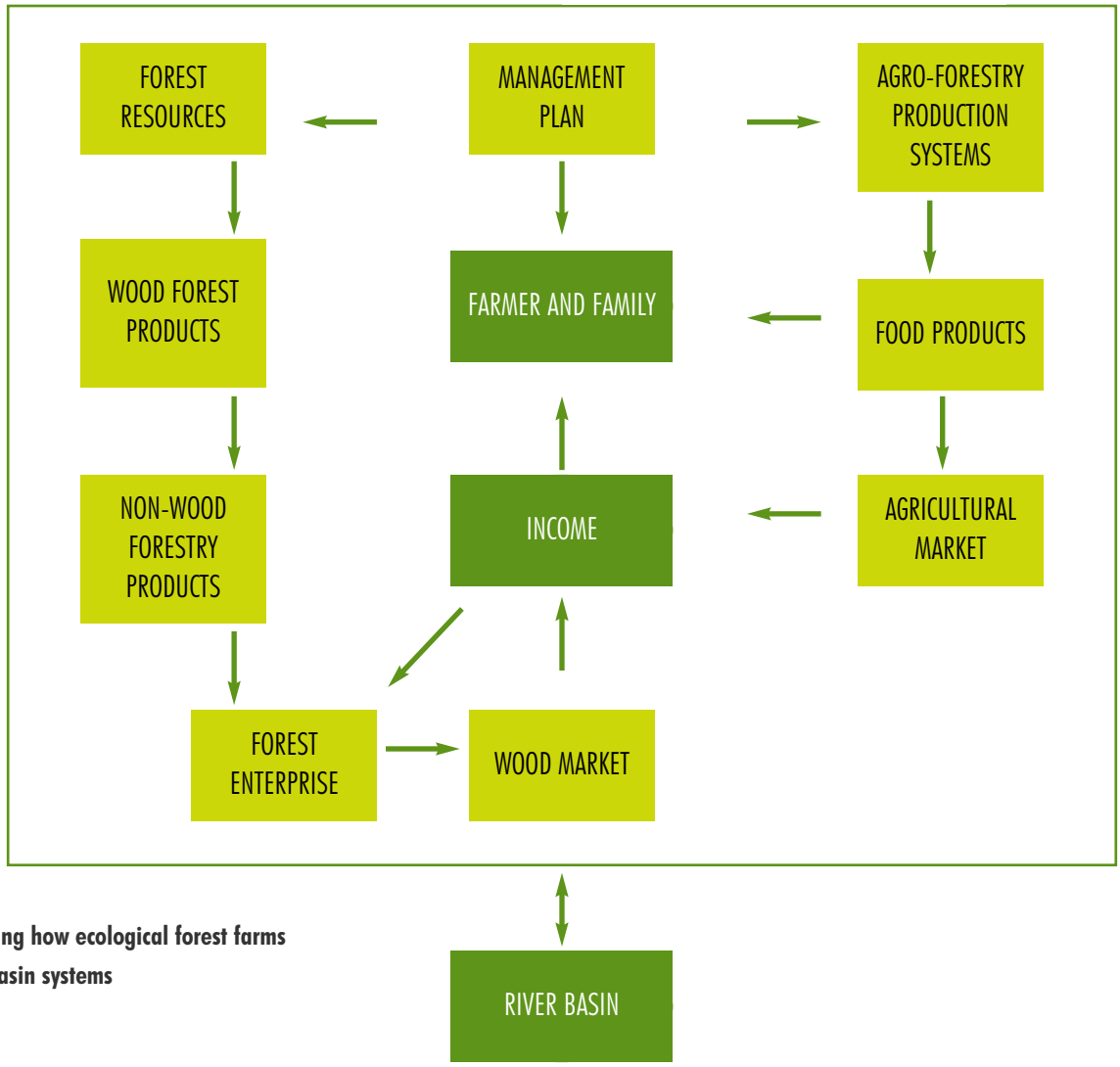


Diagram showing how ecological forest farms work in river basin systems

Results

By the beginning of 2004, 848 forest farms had been set up in the three hydrological regions of the country, an area of 91,067 hectares.

Hydrological Region	Number of farms	Area (ha.)	Planted area (ha.)	Farm size (average ha.)	Farm workers (average no.)
West	178	75 276	3 048	723	3
Centre	142	4 200	2 233	35	2
East	528	11 472	8 573	26,6	2
Total	**848**	**91 067**	**13 643**	**261,5**	**2,3**

Note that the western region contains fewer but much larger farms. Given the positive results achieved by this novel method of forest administration and control, in the Province of Pinar del Río, which has the highest woodland ratio in Cuba (39%), forest companies set up 111 farms to manage 74,100 hectares of natural woodland, 23% of the total for this province.

Farms in the eastern region are smaller (an average of 26.6 ha.) but have been established in greater numbers (528), mainly in the areas earmarked for reforestation. The eastern region has a rural population of 1,512,940 (38.5% of the total), 55% of the total number of river basins, and the smallest yearly water per capita ratio (0.7 m3). It suffers from soil erosion (74.7%) and salinity (54.7%), has a forest index of 20.5 %, and is vulnerable to food shortages. The impact of ecological forest farms in the eastern region has been very great, with 8,573 hectares planted out of 11,472 involved in this innovatory scheme. Planted areas include a belt of more than 3,000 hectares along the banks of the river Cauto, the largest in the country, which act as a water regulator.

Forestry farms have generated great expectations of sustainable forestry development and guaranteed greater manpower resources. In just over six years, planted areas (13,643 hectares) represent almost 35% of the country's overall annual reforestation total. In the eastern region alone, 74.7% of forest farm areas have been planted. The farms employ 1,025 workers, including women, a ratio of 8.3 hectares per worker. These figures show the convenience and importance of adopting forest farms in reforestation programmes for stable development, since they provide jobs, gender equality, family sustainability, and access to basic social services.

The Province of Las Tunas (Eastern Region), one of the most deforested in the country, where only 12% is woodland and the rural population is 41% of the total, is at the forefront in the application of this innovatory system (146 farms). Direct forestry production per 26-hectare farm is 3,300 m3 of wood (3,000 solid wood and 300 firewood), worth USD 75,092.

Forestry nursery on the banks of the river Cauto.

From the scientific and cultural points of view, forest farms complement the economic exploitation of environmental goods and services within forest ecosystems. The forest farm system benefits from a national fund for reforestation activities, which also serves to verify that sustainable criteria are being used. Through forest farms, advances or decline in forestry and agro-forestry activities can be monitored with greater precision, since they constitute smaller units of forestry management than the companies.

Furthermore, forest farms can serve as a benchmark in capacity building programmes for technicians, professionals and decision makers involved in forestry and environmental issues and technology, in the endeavour to reverse critical ecological situations in the agricultural areas the country's river basins.

International Interest

Interest in this movement was sparked off by a film documentary on the first forest farms, shown on Cuban television's ¨De Sol a Sol¨ programme (1997).

Results from more than 10 reports on forest farms representing the various hydrological regions of Cuba were illustrated in the 1998 Cuban Forestry Conference, which was attended by international institutions and personalities concerned with sustainable forestry development, arousing interest and approval. This novel system was the focus of attention in the 1st Conference on River Basin Soil Conservation and Management, held within the framework of the 2nd International Conference on the Environment and Development (1999).

The IIF presented some of its successful experiences, including the ecological forest farms, in the international workshops on the sustainable management of mountain areas held in Querétaro, México (1999), and Santo Domingo, Dominican Republic (2000). Forest farms were also illustrated in the Regional Conference on Mountain Areas in Latin America and the Caribbean, held in Cuba in 2002. At the end of 2003, during the Ramal National Forest Forum, held in the city of Trinidad, the farms were awarded a prize for the outstanding results achieved in the Province of Las Tunas.

In 2001 and 2002, as a result of successful reforestation along the banks of the county's rivers and reservoirs, within the framework of the National and Provincial River Basins Management Programme, forest farms featured in a number of national TV documentaries and promotional material produced by the Agriculture Ministry's Estudios CAGUA and the UNDP's film unit

In 2003, during the 3rd Latin American Conference on River Basin Management, held in Arequipa, Perú, FAO organised a workshop entitled: ***Preparing a new generation of programmes for river basin management in Latin America and the Caribbean.*** In the workshop, it was agreed to encourage the establishment of pilot ecological forest farms in river basin areas.

During the Equator Initiative of the Johannesburg Summit on Sustainable Development (2002), the UNDP, the Canadian government, the International Development Research Centre and the World Conservation Union recognised ecological forest farms as one of the 25 most successful sustainable development projects in the world.

In the Province of Granma, 55 farms out of a total of 146 have been set up with the support of international organisations such as the UNDP, UNIFEM, UNOPS, and Italian decentralised cooperation from the regions of Sardinia, Liguria and the municipality of Foligno. Recently, OXFAM Canada, too, gave its backing to a capacity building project for technical personnel and forest farmers.

The IIF, as part of the management structure of this innovative scheme, promotes forest farms nationally and internationally, backed by research results going back more than 30 years. Research has led to the development of technology for forest development, the protection of woodland and the ecological exploitation of wood and non-wood forestry products, which employs environmental criteria for forest organisation, agro-forestry systems, forest hydrology and ecological river basin management. At present, the institute carries out training activities within the framework of a project entitled: ***Strengthening of the organisational, technical and accounts management of ecological forest farms,*** in the provinces of Pinar del Río, Sancti Spíritus and Santiago de Cuba. This project, which is financed by OXFAM Canada, is promoted by the ACTAF (Cuban Association of Agricultural and Forestry Technicians).

The institute is the national coordination centre for the FAO's Technical Cooperation Network on Agro-forestry Systems and River Basin Management for Latin America and the Caribbean. It maintains stable working relations with CSIRO, IUFRO, ONUDI, IMBAR. At present, some experts from the institution are involved in work on sustainable forestry development in various countries in Central America and the Caribbean.

The employment of FOREST FARMS in other countries

The first step that needs to be taken in a country interested in adopting this scheme is to establish a legal and institutional framework for setting up innovative tenancy and land use systems. These require economic, social and environmental policies that encourage this new form of sustainable local development. Countries must also have institutions capable of identifying and diagnosing problems that compromise improvements in the quality of life for rural populations, when they do not make rational use of the natural resources with which they interact.

From the institutional point of view, the concept of sustainability must be incorporated into the programmes that are developed. Also, a central administrative authority is needed to oversee all environment aspects by introducing a packet of measures that regulate exploitation, conservation and protection of natural resources (mainly water, soil, flora and fauna), especially in river basins. It is also important that people are made to feel part of this process.

Ecological forest farms must be promoted by a central public authority responsible for agriculture, which establishes and puts into effect some basic principles. Measures should be introduced that provide guidelines for the various organisations involved in productive forestry management in those regions where the system is to be introduced. The authority must also ensure that forest farmers and their families are provided with housing and have access to basic social services.

As regards socio-cultural conditions, forest farmers must have the necessary education to be able to assimilate the essentials of any applied technology, a lot of work experience, knowledge of any traditions and autochthonous culture underlying the utilisation of wood and non-wood forest products, natural products, the multiple use of the soil for various farm, forestry, and handmade products.

Although technical aspects for farm operation depend on the country concerned, basic technical information is needed on forest and soil structure in the region or river basin, and the extent to which it is affected by various negative phenomena. Information is also needed on studies and projects for forest organisation, reforestation programmes, and agro-forestry systems in the short, medium and long terms. Another condition for the successful implementation of this innovatory scheme is the existence of a public or private forestry enterprise system, state institutions and farmers' cooperatives.

It is very important to have trained personnel. If necessary, the Cuban Forestry Research Institute and the Forest Study Centre of the University of Pinar del Río can offer technical and organisational advise on setting up initial studies for the establishment of forest farms.

Basic material resources for setting up ecological forest farms include wood and fruit trees; genetically improved seeds of economically important forest cultivars, technical know-how on establishing protected tree cultivars, agricultural supplies and building material.

To learn more

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Contacts

In Cuba, forest farms are set up through the country's Forest Enterprise System, with technical assistance from the Forestry Research Institute. Both these bodies can offer assistance in implementing forest farms in other countries, and can draw on a large qualified group of experts to help define, develop and evaluate projects. Both operate within the Cuban Agriculture Ministry (MINAGRI), which offers internships in Cuba, with support from Forest Study Centre of the University of Pinar del Río.

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The IDEASS Programme – Innovation for Development and South-South Cooperation – is part of the international cooperation Initiative ART. IDEASS grew out of the major world summits in the 1990s and the Millennium General Assembly and it gives priority to cooperation between protagonists in the South, with the support of the industrialised countries.

The aim of IDEASS is to strengthen the effectiveness of local development processes through the increased use of innovations for human development. By means of south-south cooperation projects, it acts as a catalyst for the spread of social, economic and technological innovations that favour economic and social development at the local level. The innovations promoted may be products, technologies, or social, economic or cultural practices. For more information about the IDEASS Programme, please consult the website: **www.ideassonline.org.**

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Innovation for Development and South-South Cooperation

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In the interested countries, ART promotes and supports national co-operation framework programmes for Governance and Local Development - ART GOLD. These Programs create an organized institutional context that allows the various national and international actors to contribute to a country's human development in co-ordinated and complementary ways. Participants include donor countries, United Nations agencies, regional governments, city and local governments, associations, universities, private sector organizations and non-governmental organizations.

It is in the framework of ART GOLD Programmes where IDEASS innovations are promoted and where cooperation projects are implemented for their transfer, whenever required by local actors.