



TaCRI ☘

TANZANIA COFFEE RESEARCH INSTITUTE

Annual Report 2003

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Cover picture: Improved coffee varieties are multiplied vegetatively



Mr. Edwin I. M. Mtei

*Chairman, Board of Directors
Tanzania Coffee Research Institute*

It gives me a great deal of pleasure to write a foreword for TaCRI's first Annual Report as the first Chairman of the Board of Directors of the new Institute. This first Annual Report represents an important milestone as it summarizes the activities of the Institute since its inception.

The coffee stakeholders have very high expectations indeed from TaCRI. I am proud of the achievements to date. I am confident TaCRI will play its important role and contribute to the massive task of rejuvenating the Tanzania Coffee Industry. TaCRI has started well. This gives me a great deal of hope for the future.

We have received considerable support from our stakeholders to kick-start TaCRI. I would like to record my special appreciation to the Government of Tanzania and to the European Union for their generous material, moral and financial support now and in the years ahead to implement the newly developed medium term Strategic Action Plan.

Edwin I. M. Mtei
Chairman, Board of Directors



Professor James M. Teri

*Chief Executive Director
Tanzania Coffee Research Institute*

Dear Stakeholders,

Welcome to this, the Tanzania Coffee Research Institute's very first Annual Report.

The incorporation of TaCRI in 2000 (legally operational in September 2001), represented a very clear break from the past government-led coffee research, and has placed new emphasis on the role of stakeholder-led and demand-driven research. We have a single goal, and this is to rejuvenate Tanzania's coffee industry to sustainable prosperity in order to improve the livelihoods of coffee producers and raise the country's global profile as an important, quality coffee exporter.

This report is a critical milestone in achieving our goal. It represents both the successful establishment of the Institute, and the start of our innovative five-year research and development programme (the Strategic Action Plan, 2003-2008), which will put Tanzania's coffee industry firmly on the path to recovery and build a profitable and sustainable coffee industry in this country.

TaCRI, and all of us working for the Institute, are accountable to you our stakeholders. All the coffee research and subsequent dissemination of results from that research, has been very carefully designed to ensure that it will benefit and meet the different needs of differing coffee farmers in diverse regions across the country. With this in mind, we were proactive in ensuring that the Strategic Action Plan was developed in full consultation with representative stakeholder groups.

Being our first Annual Report, we have allocated space within these pages to define our core values and aims, to list what we have achieved since TaCRI started operating, and to outline what aims we have over the next twelve months. You will be able to judge our success in next year's Annual Report.

Certainly, I have been very pleased with our achievements to date, particularly when you consider that just two years ago the research station we took over at Lyamungu in Moshi, was in a desperate state of neglect and disrepair.

Already, (thanks to significant grant support from EU/STABEX and ccess), we have begun renovations, started recruitment of a team of specialist, energetic scientists, and have forged regional and international linkages to accelerate progress. We have also identified 36 new coffee varieties that show promise in terms of high yields, disease resistance, and good cup quality. We are anticipating that by 2007, we will be producing 5 million clones of the best new varieties and that mass distribution of these will start in the same year. Discussions are in progress with CIRAD, France to acquire their tissue culture technology (somatic embryogenesis) for massive multiplication and distribution of the improved varieties.

This year, TaCRI will become increasingly visible within the Industry as we begin to publish the first of our research findings into relevant, practical technical packages. Amongst many other things, we will also be expanding our Train the Trainer programme and continuing with on-farm trials of new varieties.

We would like to extend you a very warm welcome to our Lyamungu Headquarters or indeed to the TaCRI sub-stations in Maruku in Kagera, Mbimba in Mbeya and Ugano in Ruvuma. In the meantime, should you have any ideas on how we can improve the service TaCRI provides, or would like to share ideas on any aspect of coffee production, we would be glad to hear from you.

I wish you all the best for this forthcoming coffee season.

Professor James M. Teri
Chief Executive Director
July 2003

What is TaCRI?

The Tanzania Coffee Research Institute (TaCRI) was incorporated in 2000 as a company limited by guarantee under the Companies Ordinance Cap 212 (legally constituted and operational in 2001) with the major objective of rejuvenating the Tanzania coffee industry, placing a new emphasis on the role of stakeholder-led and client demand-driven RESEARCH FOR DEVELOPMENT.

The Institute will provide a crucial public service to stakeholders in the country's coffee industry by providing coffee producers with relevant and practical technological innovations and advice that will improve productivity and quality. The result will be enhanced profitability and livelihoods for coffee producers and increased competitiveness of Tanzanian coffee on the world market.

processors, coffee traders, relevant NGOs, the private sector, and the Tanzanian Government.

Funding

TaCRI is a not-for-profit organisation. The Institute derives its income from members' contribution through cess; government and donor contributions; collaborative activities; and the sale of materials and services (eg plant materials and publications).

Being a new organisation, there is a significant financial requirement for the provision of capital for major renovations and the acquisition of new equipment to get the Institute off the ground and working effectively. A major proportion of this has been provided through a grant from the European Union, which has and will continue to be instrumental in getting TaCRI fully established and meeting its objectives.

TaCRI will also benefit from a STABEX sinking fund and possible additional funding through the Government of Tanzania.

Coffee trading is an important business



Ownership

TaCRI is owned by the stakeholders who it is serving. These include small and large-scale coffee farmers, cooperative societies and unions dealing in coffee, coffee

TaCRI Focus



TaCRI aims at developing high yielding, high quality disease resistant varieties

For any organisation or business to succeed, it is very important to have a clear focus against which activities can be planned and progress can be judged.

In September 2001 when TaCRI was launched, the team's first task was to define the organisation's focus. Through a collective process involving all personnel within the new organisation, a clear set of values and objectives was produced, against which TaCRI will base its management and operational working practice.

Our Values

TaCRI is committed to operating in line with the following key values:

- Strong demand driven technology development and dissemination which meet the needs of its stakeholders and are market focused.
- Enlightened leadership.
- Excellence and high standards of performance.
- A sense of urgency.
- Mutual respect and trust

amongst all levels of staff.

- Cost consciousness.
- Team work.
- Spirit of partnership.
- Alleviation of poverty and improvement of the livelihoods of coffee growers.

Our Vision

TaCRI's vision is to contribute to the transformation of the Tanzanian coffee industry to sustainable prosperity.

Our Mission

The Institute will achieve this vision by developing and disseminating appropriate technologies to improve coffee productivity and quality in Tanzania, within a supportive policy framework. The desired result is for increased competitiveness of Tanzanian coffee on the world market, and ultimately increased incomes, reduction in poverty, and improvement in the livelihoods of coffee growers.

Our Goal

TaCRI's goal is to create a profitable and sustainable coffee industry in Tanzania.

Achieving our Goals

TaCRI will operate within the following parameters:

- Work closely with all coffee stakeholders to create a shared vision of what can realistically be achieved.
- Organise our resources effectively and efficiently to meet stakeholders' needs.
- Strive to have a coffee

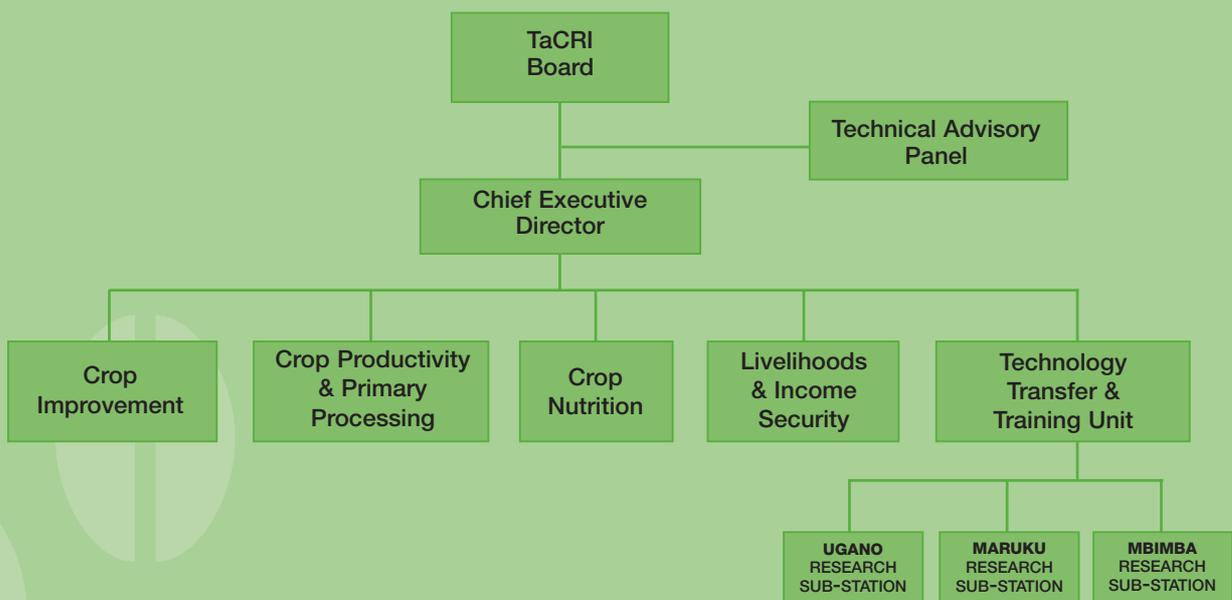
research institute that is well-managed, financially viable, offers quality, is forward thinking and renowned both nationally and internationally.

- Attract, motivate and retain a team of excelling scientists, other professionals and supporting staff.
- Concentrate on the development of technologies that are aimed

at solving existing or foreseeable problems to the coffee industry.

- Ensure that all innovations are quickly and effectively communicated to the end users.
- Forge mutually beneficial, national, regional and international partnerships.
- Continuously monitor and review progress and achievements.

TaCRI Organisational Structure



Defining our 5 Year Strategy 2003 - 2008

The Strategic Action Plan

TaCRI's most important key priority and achievement to date has been the formulation of a medium term (five year) research and development strategy, based on the needs of stakeholders.

The purpose of developing this crucial strategy (known as the Strategic Action Plan) was to create a practical and action-oriented operational framework for TaCRI. This would not only develop an organisational structure for the new Institute, but would also provide action plans and budgets for a 5-year research and development programme to rejuvenate the Tanzanian Coffee industry. The Strategic Action Plan would become the benchmark against which TaCRI would meet its objectives and promises to stakeholders.

A 3-Phase Approach

The Strategic Action Plan was developed in three phases during July/August/September 2002, and January 2003. The work was undertaken by specialists from Cranfield University in the United Kingdom, in association with the Chief Executive Director and staff of TaCRI.

The first phase included a countrywide analysis of stakeholders, and a stakeholders' workshop during

which the major priority activities identified by stakeholders that would be undertaken by TaCRI, were confirmed.

During the second phase, previous and on-going research was reviewed and an organisational structure for TaCRI was developed. The need for training and research to assist the Institute in meeting its objectives was assessed, and the benefits to the industry of TaCRI seeking to work in partnership with other national, regional and international organisations was also considered.

In the final phase, a comprehensive and practical framework for TaCRI was developed, together with specific outputs, action and timescales for each of the five departments, defined in phase two. This included an action plan for all departments and comprehensive budgets for the next five years.

The final Strategic Action Plan was approved by the Board of Directors on 20th January 2003.

Meeting Stakeholder Needs

The technical research needs identified by stakeholders as being of immediate importance include: the continued development of high-yielding, disease resistant, high quality varieties (both Arabica and Robusta), including their effective and rapid release for evaluation by farmers in different coffee



Stakeholder analysis

based farming systems (ecological areas); cost effective integrated pest management systems; nutrient management (organic and inorganic), including the provision of soil and leaf analytical services (commercial); and primary processing technologies suitable for use at the farm level. The result will be to reduce costs of production, increase productivity and quality, making Tanzania coffee competitive to increase income and profits.

Technology transfer and training are seen as important TaCRI activities if Tanzania is to regain and enhance its reputation for producing large enough volumes of quality coffees. With its head office at Lyamungu, Kilimanjaro Region, TaCRI will serve the whole country through sub-stations in the south at Mbimba in Mbozi District, Ugano in Mbinga District and in the west at Maruku in Bukoba District.

In addition, there is a need to understand and explain the economics of coffee production

and processing, to influence policy makers, to support new marketing initiatives, and to understand the livelihoods of farming households to ensure that research is appropriate to their needs. TaCRI will seek to identify and document the minimum economic farm size, and to identify means of improving returns to farmers from coffee growing. This could include the creation of more farmer groups to share resources. The role of credit in making inputs, such as inorganic fertilisers, available to farmers is, for example, another researchable issue.

In short, this research area can be summarised under the title 'income security' to reflect the need to focus research on livelihoods dependent on cash to sustain them, and not just on technologies that may or may not be affordable. TaCRI will respond to this need although it has not been normal to include it in the mandate of traditional crop based research institutes in the past.



Rigorous pruning is required to start the rehabilitation of neglected research trials.

Management Activities

The responsibility of the TaCRI Board of Directors' and senior management is to ensure that a well-managed, financially viable, customer focused, forward thinking, respected and sustainable coffee research institute is established.

The Management team is responsible for pursuing policy measures and reforms, continuing the fine tuning of the organisational structure and recruiting top quality personnel. Overall, management is in charge of coordinating the activities of each department within the Institute to ensure effective and timely dissemination of results, and to ensure that research is based on the most promising researchable issues relating to Tanzanian coffees and Tanzanian coffee growers.

Major Achievements: 2001-2003

- The Strategic Action Plan was successfully developed in full participation with stakeholders. It was approved by the TaCRI Board in January 2003. Impressive progress is now being made in initiating implementation of the plan.
- EU/STABEX funding was secured to kick-start TaCRI
- Two TaCRI team-building workshops were held during 2002. The purpose was to foster and strengthen the spirit of team work amongst the staff and to define the common values within TaCRI.
- The Lyamungu Research Farm has been rehabilitated beyond recognition. Many of the research trials were taken over by TaCRI in a bad state of neglect. These have been rehabilitated in order that the trials can be used once again, to collect meaningful data.
- TaCRI personnel from a range of disciplines took part in training programmes and workshops both within Tanzania and internationally.
- Recruitment of full complement of staff is progressing well.
- Initial survey work has been completed on TaCRI facilities, providing a basis for decisions on renovation plans and budgets.
- Lack of access to contemporary literature for TaCRI scientists is a major handicap for serious research. To address this, the Institute has acquired The Essential Electronic Agricultural Library (TEEAL) Information retrieval system, and joined the Programme for the Enhancement of Research Information (PERI). Both of these have given TaCRI almost unlimited

electronic access to a wide range of journals and current research.

Major Priorities: 2003-2004

- Continue recruitment of high quality staff.
- Continue to change and improve the work culture in line with the Institute's values.
- Begin rehabilitation of Lyamungu Headquarters and sub-stations and tender process for purchase of capital equipment.
- Revise Memorandum and Articles of Association and make recommendations for the revision of the Coffee Act as necessary.

Finance & Administration



*Dr. Omar Kizango
Head of Department*

Major Achievements: 2001-2003

- Developed TaCRI's personnel, finance and administrative policy documents.
- Oversaw taking of inventory of assets by a Board of Survey appointed by government to facilitate handover to TaCRI.
- Improved communication at Lyamungu center with the outside world.
- Carried out limited estate rehabilitation and maintenance.
- Strengthened security at Lyamungu center.
- Successfully redeployed about 50% of former LARTI staff.

Major Priorities: 2003-2004

- Computerise the accounting system and improve IT skills of accounts section.
- Develop and implement Information Management System (MIS).

Crop Improvement Department



Dr. Deusdedit Kilambo, Ag. Head of Department

One of the major constraints to productivity and the development and growth of Tanzania's coffee industry has been caused by the continued cultivation of old varieties that are low yielding and highly susceptible to the major coffee diseases, coffee leaf rust (CLR) and coffee berry disease (CBD). One of TaCRI's major objectives is to identify high yielding varieties resistant to CLR and CBD with large bean size and high cup quality that perform optimally within the diverse coffee production areas of Tanzania.

The role of the Crop Improvement Department is to develop and promote new varieties of Arabica and Robusta coffee that deliver high yields, are disease resistant,

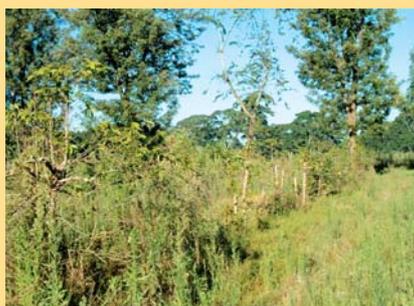


Mr. Damian Mtenga, Hands-on coffee research

and which have good bean size and cup quality. These new varieties will be put under accelerated multiplication over the next 5 years and will be used in a massive national re-planting programme scheduled to start in 2007. The breeding programme will be reinforced by the appointment of a new experienced plant breeder, with visiting regional and international technical assistance.



Above: a coffee field after rehabilitation. Right: a neglected field before rehabilitation.



Major Achievements: 2001-2003

- The department has identified a total of 36 coffee varieties that show promise of all the improved qualities required. Trials continue on these to find the best-of-the-best varieties, i.e, those plants that optimise all of the required features.
- A total of about 20,000 hybrid plants were multiplied through tissue culture in France. These are currently being evaluated on selected farms in Tanzania.
- 35 samples of promising varieties were sent to Kenya for cupping evaluation. All 35 samples were rated FAQ (export quality). Of these more than 57% were rated as medium body and medium to good acidity and 74% of samples sent to the Tanzania Coffee Board (TCB) were of classes 5-6. Further work to confirm these results, including cup tasting of additional samples, is in progress.
- A total of 1,482 selected coffee trees have been screened for Coffee Leaf Rust (CLR) since September 2001, of which just 2% were found to have rust infection. Field trials continue to fine tune selection of best trees against CLR.
- A total of 433 selected trees were screened for CBD resistance under laboratory conditions, of which 13% were found to be resistant.
- The department evaluated a series of multi-locational trials, in which 16 varieties have been planted in 25 different coffee growing areas of Tanzania, to assess which varieties perform best in which regions. Evaluation of 22 of the 25 trials has confirmed that there are more potential improved hybrids for release, in the pipeline.
- Six best-bet Robusta clones selected from farmers' fields under Stabex/coffee management unit (CMU) in 1995 and released in 1996 are under accelerated vegetative multiplication in impressive vegetative propagation units (VPUs) in Kagera. Unfortunately there has been poor uptake of the seedlings, not least because of farmer demoralisation. Since then demand for these new varieties has increased, with higher coffee prices being paid to farmers calling for continued production of planting materials.
- Extensive surveys were undertaken to confirm the geographic distribution of Coffee Wilt Disease (CWD) countrywide. Results confirmed that in Tanzania, only Robusta coffee is affected by CWD. More detailed surveys have been initiated in Kagera (where CWD is known to be a particular problem) to establish the severity of the disease and identify coping mechanisms. CWD is a potential threat to the Robusta coffee industry in Kagera. Preliminary recommendations to prevent further distribution of the disease are being disseminated.

Major Priorities: 2003-2004

- Recruit a plant breeder to take over as head of the Coffee Improvement Department & contract a senior coffee breeder as visiting consultant.
- Rehabilitate all neglected new variety selection fields with optimum crop husbandry & inputs.
- Renovate the coffee nursery and acclimatisation room to full operation.
- Renovate and equip the plant pathology (disease) laboratory and controlled temperature rooms.
- Install pilot tissue culture laboratory to assess the ability of selected trees for propagation through somatic embryogenesis.
- Continue selection of Robusta varieties that are resistant to Coffee Wilt Disease.

Crop Productivity & Primary Processing



Dr. Grace Chipungahelo, Head of Department

Central to the future success of the coffee industry in Tanzania is the need to increase productivity per unit area or per tree, depending on the farming system, to reduce costs of production and enhance quality at the level of primary processing.

The function of the Crop Productivity & Primary Processing Department therefore, is to support the national coffee rehabilitation and replanting programme through effective research in crop husbandry practices and integrated pest management in Tanzania's diverse coffee farming systems. The department will also provide information and undertake research on primary processing technologies, and provide meteorological data.

Major Achievements: 2001-2003

- Existing research on practical and best-practice crop husbandry and pest management has been reviewed by the department. This information has been developed into a set of key technical messages that will be produced as leaflets for distribution to farmers during 2003/4.
- A botanical garden has been established at Lyamungu to assess the effectiveness of specific plants against coffee insect pests. These have included plants that farmers have identified as having pesticide properties. To date, *Tephrosia vogelii* (Utupa) and Neem (Mwarobaini) have both been found to have pesticide qualities.

Major Priorities: 2003-2004

- Complete preparation and publication of technical information on a range of existing effective crop husbandry and integrated pest management techniques, for distribution to farmers.
- Start trials to identify the most promising plant density and pruning regimes for the new varieties, to provide farmers with advise on the best combinations within different farming systems (including banana intercropping).
- Initiate experiments to identify what the most promising methods of pest management are, to provide farmers with recommendations on how they can best control insect pests with minimal use of insecticides.
- Collate all information on primary processing technologies and identify those most appropriate for small farmers. Establish links with the University of Dar es Salaam and Sokoine University of Agriculture (SUA).

Crop Nutrition Department



*Mr. I. K. Kullaya,
Head of Department*

Declining soil fertility associated with a lack of affordable inorganic fertilisers or availability of organic manures, is another of the major reasons for low and/or declining productivity and quality of coffee in Tanzania.

TaCRI's Crop Nutrition Department has been created to address this issue, and in particular to develop and

promote relevant and cost effective soil and nutrient management systems to help farmers make balanced decisions about how they can best manage soil fertility. The department will also develop soil and plant analytical and reporting procedures linking coffee growers to regional analytical laboratories in the country.

Major Achievements: 2001-2003

- Old trials inherited from former Lyamungu Agricultural Research Institute (LARTI) were evaluated, and shelved or rehabilitated accordingly. Rehabilitated trials have included:
 - Evaluation of the effectiveness of locally mined rock phosphates as alternatives to the currently available imported commercial sources of phosphorous. If successful, the local phosphates will provide coffee farmers with a much cheaper and readily available source of phosphorous fertiliser;
 - Assessment of optimisation of fertiliser quantity to coffee bush density;
 - Optimisation of fertiliser requirement of high density coffee; and
 - Lime trial.
- More than 100 soil samples were provided by farmers to be analysed for standard soil fertility parameters. Advice was given to farmers on how to adapt their soil fertility management systems accordingly.
- A major initiative to retrieve existing information and research on practical and cost-effective soil nutrition technologies was started. Literature in preparation includes the use of fertiliser and manure on coffee; soils suitable for coffee growing; and compost-making from coffee residues.
- The department actively participated in the 2002 Nanenane and Kilimanjaro Agricultural Shows.
- Over 50 secondary school students were given theoretical and practical training on aspects of soil and coffee production as part of their field studies, as were a group of 30 students from SUA. The important objective of this exercise was to attract young people to coffee production, at the moment dominated by older generations.

Major Priorities: 2003-2004

- Complete review of available information on integrated soil and nutrient management of coffee and produce educational literature for farmers that can be used for immediate on-farm evaluation.
- Identify the most promising researchable issues suitable to the different coffee farming and livelihood systems throughout the country.
- Continue trials to evaluate the most promising technologies for optimum organic and inorganic fertiliser use to maximise productivity and profitability.
- Establish on-farm trials in at least four ecological zones.
- Start experiments to assess the response of new varieties grown at high densities, that will assist in providing advise to large-scale farmers on the most profitable applications of nitrogen, phosphorous and potassium.
- Continue with experiments on locally mined rock phosphates, expected to be completed in 2008.



Livelihoods & Income Security Department

Demonstrating the impact of Coffee Wilt Disease in Kagera



400,000 farmers and their families derive livelihoods from coffee-based farming activities in Tanzania. Little is known about the social and economic factors that contribute to the sustainability and success of their contrasting agricultural and livelihood systems. In order for TaCRI to provide really meaningful and relevant technologies and advise to these many farmers, it is crucial

that more is understood about the environment in which they live and work.

The Livelihoods and Income Security Department is a new department set up firstly to describe and understand the diversity of farming and livelihood systems in the coffee growing areas of the country, secondly to prioritise the barriers to productivity and profitability, and thirdly to propose, evaluate and promote possible solutions.

Major Achievements: 2001-2003

This department is still in the process of being put into place and will begin operating over the next twelve months.

Major Priorities: 2003-2004

- Recruit an economist and rural sociologist.
- Undertake social and economic surveys in a number of representative districts to improve understanding of the issues facing this key stakeholder group.
- Evaluate survey results to identify solutions to improve the livelihoods of coffee farmers.
- Use findings to give practical guidance to other departments within TaCRI to ensure that the Institute's work continues to be appropriate to the needs of the farmers.

Technology Transfer & Training Unit

The Technology Transfer & Training Unit of TaCRI plays a crucial role as the mouthpiece for all of TaCRI's work. The Department is responsible for communicating the results of the Institute's output to the coffee industry, in ways that are appropriate and meaningful to its many different groups of stakeholders.

The Unit's other important role is to assist in the multiplication and distribution of improved coffee varieties to farmers, in anticipation of a major national replanting programme over the next few years. The target is that the best varieties will be available commercially and



Mr. T.S. Nzallawahe, Head of Department

producing rooted cuttings at a rate of 5 million new plants every year, by 2007. The likely release and first large-scale distribution of these varieties to coffee growers, is expected to be 2007-08.

Major Achievements: 2001-2003

- A clonal garden for clonal multiplication of selected new varieties has been developed at Lyamungu. To date, 8,500 mother trees have been planted. This is a major achievement considering TaCRI started in Sept. 2001 with just single trees for each variety.
- The vegetative propagation units (VPUs) at Lyamungu have been expanded to include a new VPU using low cost and easy-to-construct materials, which is being evaluated for future clonal multiplication by smallholder farmers.
- The department has initiated a training programme (Training of Trainers) in which extension staff and farmer group leaders are equipped with the necessary knowledge and skills to disseminate important technical messages down to grassroots. To date, 428 individuals have received training in 12 target coffee growing districts of the country. Almost 800 farmers received training at Ugano Sub-station in Ruvuma.
- Follow-ups have shown that coffee quality produced by farmer groups is improving following training, resulting in improved returns to growers. As a consequence, interest in the concept of farmer groups has increased significantly.

- TaCRI has received more than 500 local and foreign visitors who have included growers, scientists, students, development partners, administrators and politicians.
- Initial contacts have been made with District Coffee Subject Matters Specialists (DCSMS) in the 12 target districts as the front line partners in TaCRI's technology transfer strategy.
- The preparation of extension messages is in its final stages for distribution before the end of the year.
- Training courses on clonal multiplication of coffee have been initiated and a major course is scheduled for the end of July 2003.
- TaCRI has participated in one national Agricultural Show and two district shows where emphasis was placed on rejuvenation of the coffee industry through the development and dissemination of appropriate technologies.

Major Priorities: 2003-2004

- Produce a medium-term communications strategy which will ensure timely, appropriate and targeted distribution of key technical messages to different stakeholders.
- Liaise with departments to retrieve and develop up-to-date technology packages in key subject areas - distributed to a minimum of 50 farm groups and 10 estates by mid-2004.
- Produce training materials on all aspects of coffee production and primary processing for testing mid-2004.
- Continue with the Train the Trainers Programme.
- Continue the expansion of the mother tree gardens to 10,000 plants by the end of 2004. The target is for the production of 500,000 clonal seedlings annually by 2004 for distribution to farmers, who will be challenged to start their own mother gardens for further expansion of the project. The ultimate target is to produce 5 million cuttings a year nationwide by 2007.

Case Study

Process of Accelerated Multiplication of Improved Coffee Hybrids



Nurturing new coffee seedlings taken from mother trees

One of TaCRI's most important roles is the development and mass distribution of new disease resistant, high quality and high yielding coffee varieties.

This is a long process and the Institute is tackling the challenge in the following ways.

Selecting new varieties

Firstly, those coffee varieties that match the required characteristics of disease resistance, high yields, bean size and cup quality, are being selected by the crop-improvement scientists. This not only involves experimental trials at the Lyamungu Research Centre, but also requires on-farm trials to assess the performance of the hybrids in 'real farm' scenarios against existing commercial varieties.

Mass Multiplication

Once the best varieties have been identified, the task then is to accelerate mass multiplication, and mass produce the plants for distribution to coffee farmers, in order that they can start the process of replacing old varieties with the improved varieties, so essential for the rejuvenation of the Tanzania coffee industry.

Tissue Culture Multiplication

The most efficient way of mass-production is through tissue culture. This method reproduces identical plants (clones) of the selected mother tree using tissue culture (somatic embryogenesis). The advantage of this technique is that one can simultaneously produce thousands and thousands of offspring from one mother tree. No tissue culture facilities for coffee currently exist in Tanzania, although TaCRI has already mass-produced a selection of the new varieties at a specialist tissue culture centre in France (CIRAD). These are currently being evaluated on a number of small and large farms across Tanzania to assess their performance within different environments and against existing commercial varieties. In addition, TaCRI in collaboration with CIRAD, will construct a small tissue culture laboratory in Tanzania to evaluate if the improved varieties can be multiplied by somatic embryogenesis and to support commercial tissue culture activities in the future.

Clonal Multiplication

In the meantime, the more traditional method of vegetative clonal multiplication is being utilised. A one hectare clonal garden has been developed at Lyamungu with a target of 10,000 mother trees of the best performing varieties. As these mother trees grow and start to produce new shoots, cuttings from these shoots will be harvested and nurtured into seedlings. These seedlings will then themselves be distributed to secondary clonal gardens that will produce more seedlings for coffee growers.

The clonal garden is expected to have reached its target of 10,000 mother trees producing 500,000 clones annually by the end of 2004. The ultimate goal is to have coffee farmers across Tanzania starting up their own low cost propagation units and generating their own clones from mother trees provided by TaCRI. The target is to have production of 5 million cuttings of the new varieties annually by 2007, to start the massive exercise of replacing the estimated 200 million coffee trees currently under cultivation in Tanzania.

Because the tissue culture technique is so much more rapid than vegetative propagation, it is hoped that this technique will be successful in accelerated multiplication. The TaCRI Board is mindful of the importance of rapid accelerated multiplication of the new varieties in its aim to rejuvenate the coffee industry.

Map of the main coffee growing regions of Tanzania showing key coffee research and training centres

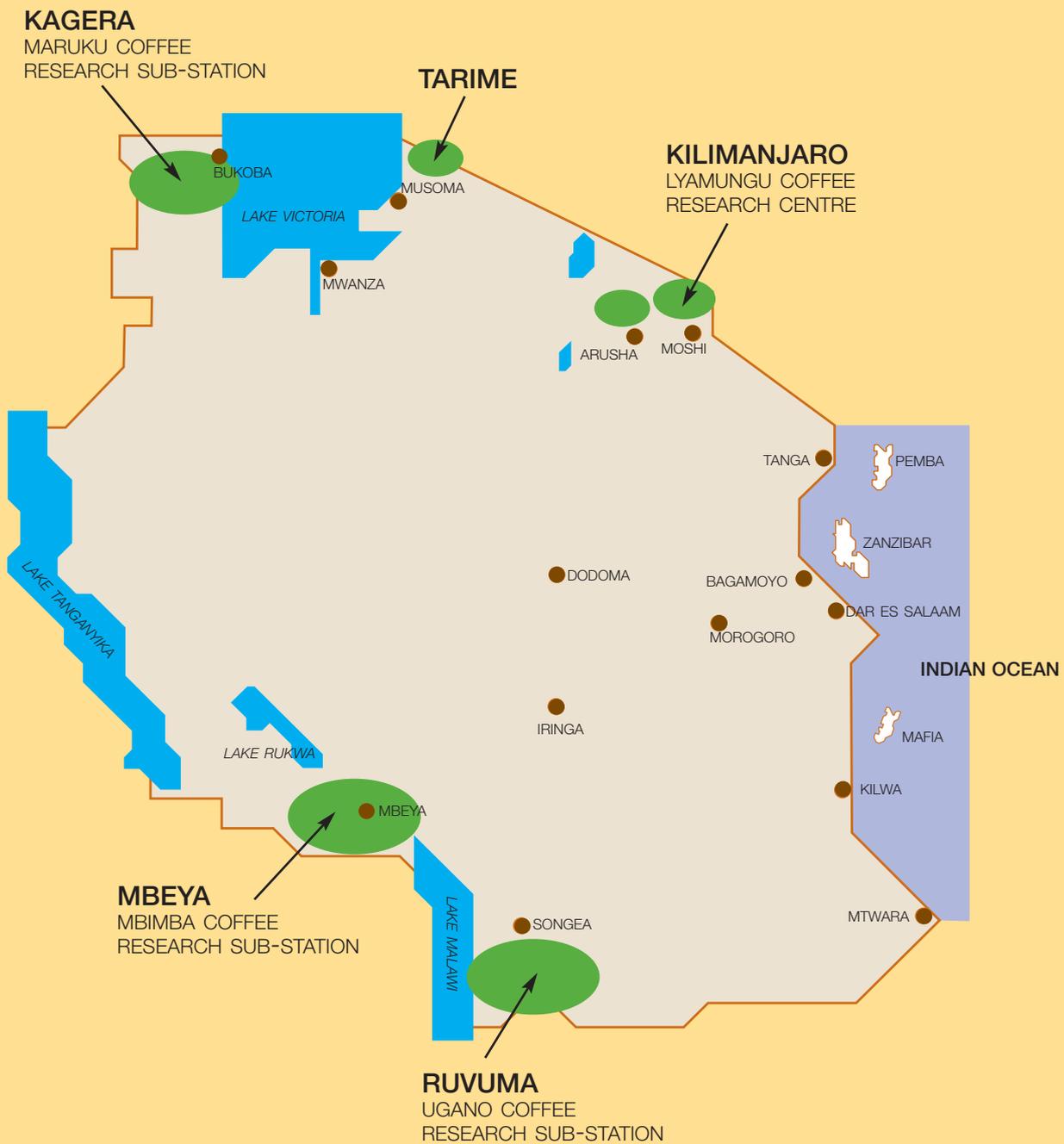


Photo credits

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TaCRI ☘

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