

TECHNOPOLICY BRIEF 14

RESEARCH PRIORITIES FOR
KENYA'S CUT-FLOWER
INDUSTRY: FARMERS'
PERSPECTIVES

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AFRICAN TECHNOLOGY POLICY STUDIES NETWORK

Published by

The African Technology Policy Studies Network
P.O. Box 10081 - 00100, General Post Office,
Nairobi, Kenya.

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Policy Studies Network (ATPS)

Printed by
Majestic Printing Works

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ISBN:

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One of the objectives of the network is to disseminate research results to policy makers, legislators, the organized private sector, civil society, mass media and farmers' groups through publications, dialogue and advocacy. Among its range of publications are the Working Paper Series (WPS), Research Paper Series (RPS), Special Paper Series (SPS) and the Technopolicy Briefs.

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Acronyms

ACP	African Caribbean and Pacific
ATPS	African Technology Policy Studies Network
CTA	Technical Centre for Agricultural and Rural Cooperation
EU	European Union
HCDA	Horticultural Crops Development Authority
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KARI	Kenya Agricultural Research Institute
MoA	Ministry of Agriculture
MoU	Memorandum of Understanding

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1.0

Background

The Kenyan floriculture sub-sector is the fastest growing in the horticultural sector contributing Kshs. 18, 719 billion (•207.99 billion¹) out of the total horticultural exports of Kshs. 32,590 billion (•362.1 billion) according to Horticultural Crops Development Authority (HCDA) statistics (2005). In the last decade (1995-2004), Kenya's cut flower export earnings grew by more than 300 percent at a time when the country's overall export growth stood at 40 percent. Over the same period, the volume of flower exports increased fifty-fold from 29,373 metric tonnes in 1995 to 81,217.83 metric tons in 2005 (HCDA, 2005) as illustrated in Table 1.

Table 1: Volumes and values of cut flowers exported from Kenya (1995-2004)

Year	Volume in MetricTonnes	Value in Kshs. Million	Value in Euros Million
1995	29,373	3,642	40.47
1996	35,212	4,366	48.51
1997	35,850	4,888	54.31
1998	30,220	4,857	53.97
1999	36,992	7,235	80.39
2000	38,757	7,166	79.62
2001	41,396	10,627	118.08
2002	52,106	14,792	164.36
2003	60,983	16,496	183.29
2004	70,666.3	18,720	208
2005	81,217.8	22,897	254.41

Source: HCDA Export statistics (all figures rounded to the nearest whole number)

¹ All conversions are according to 2006 average exchange rates of Kshs. 90 to the euro

It is noteworthy that the contribution of small-scale flower growers to these export figures is minimal and on the decline as illustrated in table 2. Recent findings by Fintrac (2005) have shown that the share of summer flowers in the total flower exports is under a tremendous decline (Table 2).

Table 2: Estimated share of summer flowers from total exported flowers (2000-2003)

Year	Volume (Million Tons)				Value (KES Million)			
	2000	2001	2002	2003	2000	2001	2002	2003
Total exports	38756.7	41396	52106.7	60982.9	7165.6	10626.9	14792.3	16495.5
% share of total	13.5	9.2	6.4	5.1	8.6	6.2	4.1	4.8

Source: Fintrac 2005

The Horticultural Crop Development Authority (HCDA) has noted that there is enormous growth potential in the small-scale flower growers if appropriate financial and technical assistance as well as a supportive policy can be put in place (Kiptum 2005). Most small-scale farmers are located in Nyandarua, Thika and Kiambu districts and mostly grow summer flowers such as eryngium, arabicum, tuberosa, mobyduck, mollucella, ornis, lilies and agapanthus.

2.0

The Contribution of Research in the Floriculture Industry

The overall enormous growth in value, acreage and volume of Kenya's cut flower industry has been largely attributed to a robust private sector involvement and externally-sourced knowledge and technologies. Kenya has adequate technical and human capacity and skills but this has not been adequately utilized by the industry. A study jointly conducted by the African Technology Policy Studies Network (ATPS) and the Technical Centre for Agricultural and Rural Cooperation (CTA) in 2004² found weak linkages/interactions between the flower farmers and the local research system causing the floriculture industry to rely on external³ knowledge to solve the industry's problems. This over-reliance on external knowledge has contributed to the under-utilization of indigenous research capacity in Kenya, even though most of the stakeholders interviewed concurred that Kenya has adequate skilled and well-trained manpower.

A number of factors explain the weak linkages and consequent under-utilization of Kenya's indigenous research capacity. They include:

² The ATPS/CTA study in 2004 focused on the processes by which actors in the industry harness science, technology and innovation to bring new knowledge and technologies into economic use. For further insight see Bolo (2005). *"Agricultural, Science, Technology and Innovation Systems: the case of Kenya's floriculture industry."* CTA, the Netherlands.

³ External knowledge in this case refers to knowledge which is sourced from outside Kenya and for which Kenya's flower farmers have to pay heavy consultancy fees and royalties. It is knowledge generated by the international research as contrasted with the local research system

a. Organizational cultures and procedures

Over time, organizations develop certain habits and practices that determine how they relate to other actors within the system and respond to ‘new shocks.’ The weak linkages between the local research system and the flower growers is characteristic of the private – public institutions dichotomy. The large flower growers (who dominate flower business) are private companies who are interested in keeping trade secrets to ensure their survival and competitiveness in the market. On the other hand, the local research system consists mostly of public institutions, such as, Kenya Agricultural Research Institute (KARI) and the universities whose mandate includes service to the nation and are obligated to disseminate any information that would help improve the livelihoods of the general populace. The public research system therefore considers such information, knowledge and technologies as public goods. This divergent approach to information and knowledge acquisition, sharing and use undermines a close interaction and sharing of knowledge and information between the industry and the public research institutions.

Moreover, the slow, bureaucratic procedures in the public research institutes undermine their ability to respond to urgent farmers’ requests. During the interviews, farmers narrated their experiences with public research institutions whereby it took up to four months to get results from local laboratories, whereas if they sent samples to laboratories abroad, it would take them about two working days to get results by email. Farmers’ needs (such as disease outbreaks) are usually urgent and require immediate solutions. The delays from the local public research system forces farmers to seek solutions from international research establishments.

b. Attitudes and perceptions

More often, research priorities in public institutions are set by the scientific community with little attempt to involve the beneficiaries in priority setting. This tendency has led to research institutions

being isolated from the immediate needs of society. This approach is often motivated by the assumption that the scientists and researchers know what the farmers want. As such, research often ignores farmers' perceptions hence the outcome often does not satisfy farmers' needs. It is noteworthy that KARI has begun involving stakeholders and intended beneficiaries in setting the research agenda for the institute and has involved other stakeholders in priority setting since mid 1990s.

Farmers in their daily activities experiment and continuously innovate, sometimes accidentally. Unfortunately, scientists/researchers fail to notice these innovations and when they do, they question the scientific basis of farmer's innovations. While the scientific rigour should not be compromised, it is important that the research community appreciate that the farmer innovations provide solutions to their (farmers') immediate problems. The research community should consider how to optimize/add value to and improve the farmer innovations using approved scientific methods. Flower farmers on the other hand are seldom willing to disclose their innovations to scientists and researchers for fear of losing the innovations. Farmers also view researchers as better versed in theory while inexperienced and lacking in the practical skills of flower growing. These attitudes and lack of trust/confidence hinder the smooth collaboration between the farmers and the researchers/scientists.

c. Weak operational capacity of public institutions

Though Kenya has the requisite technical and human capacity to serve the floriculture industry, they are not adequately financed to respond effectively to the farmers' needs. This has been attributed to lack of funds and operating facilities. During the interviews, it emerged that KARI-THIKA had introduced some flower varieties (such as mobydick, lilies, gerbera, gladiolus amongst others) which had been tested in parts of Nairobi, Eastern and Central provinces. These varieties proved popular with the small-scale farmers but the

farmers lacked the capacity to continually produce these flowers and tended to rely heavily on KARI-THIKA to support their enterprises through provision of seeds. KARI-THIKA helped small-scale farmers import seeds for lilies but the farmers were unable to continue after the KARI-THIKA support ceased while the Center has been able to supply seeds for certain flower varieties such as arabicum and gladiolus. The Center has taken to signing memoranda of understanding (MoU) with large-scale flower farmers for service provision in which the large-scale farmers meet part of the costs of the services rendered.

3.0

The Case for Demand-led Research in Floriculture Sub-sector

The above findings underscore the need to improve the interface between and among scientists, researchers, farmers, policy makers and service providers and build the capacity of industry stakeholders to conduct demand-led research. There is also the need for greater recognition of the value of farmers' experimentation and innovation.

In response to that need, a multi-stakeholder team comprising the Ministry of Agriculture (MoA), the Kenya Agricultural Research Institute (KARI), the Horticultural Crops Development Authority (HCDA) and Karen Roses Ltd (representing farmers) under the leadership of ATPS and with financial support from CTA embarked on a national case study whose main purpose was to accord farmers and other research consumers greater involvement in setting the research agenda for the industry. The team held consultative meetings with farmers (with special emphasis on the small-scale farmers) and other stakeholders in order to foster closer collaboration between the local research system and the flower industry.

The specific objectives of these consultations were:

- To facilitate the development and implementation of demand-led research programmes
- To bring relevant issues to the attention of policymakers
- To build capacity of stakeholders in participatory research priority setting
- To facilitate closer dialogue between the research community and the beneficiaries and consumers of research outputs

These consultations realized two key outcomes namely:

- Farmers came up with a prioritized list of research topics that would address both the short-term and long-term needs of the industry
- Farmers and other stakeholders drew up a list of recommendations that would require policy interventions/action in order to strengthen the industry.

This policy brief summarizes the results of consultative meetings with farmers and other stakeholders in Thika, Limuru and Naivasha held between March and June 2006. It also highlights some non-research policy recommendations suggested by the farmers during these consultations.

4.0

Farmers' Key Concerns

During the consultative meetings, farmers raised a number of key issues undermining their ability to attain optimum productivity. These issues are summarized below:

a. Harnessing Farmers' Innovations

Farmers continuously innovate but the innovations need to be 'perfected' and scaled up. When farmers are innovating, the process of experimentation and innovation is seen as part of the daily routine and activities. Farmers narrated how in the course of their daily activities, they discovered a lot of bio-control agents in the farms that were useful in controlling various pests and emphasized that this knowledge needed to be harnessed through continuous interactions between the farmers and researchers at the farm level. They called for a liaison officer who would pick up these innovations and use research methods to scale up the innovations, improve the methodologies and come up with scientifically tested products. Farmers suggested that KARI (and other research institutions) should work closely with farmers and engage itself in the isolation, documentation and replication of these local technologies in pest management.

Farmers applauded the efforts of the input suppliers who had their representatives stationed in the growing areas. These representatives visited and interacted with farmers in their farms, helped identify farmers' problems and provided solutions. Research institutions are encouraged to emulate this example to allow researchers interact more closely with farmers to enable them pick up, modify the innovations, monitor progress and give feedback to farmers. Moreover, the farmers' experiences form a crucial body of tacit

knowledge that can be harnessed to form the basis of new research in the industry.

b. Development of indigenous flowers for commercialization

Farmers noted that there was over-reliance on imported varieties such as roses, carnations, lilies, alstromeria amongst others for which farmers have to pay royalties. They noted that Kenya is rich in biological diversity and research should be conducted on Kenya's flora to identify and develop indigenous flower varieties for commercialization. The KARI case of *mobydick* is an example of how local research could be targeted to harness the country's biodiversity. It also emerged that farmers have been trying to domesticate some wild flowers such as papyrus (*Cyperus papyrus* L) on their own and called upon the researchers to support their efforts to introduce new flowers in the market.

Closely related with the need to develop indigenous flowers, farmers also strongly recommended the breeding of new flowers that could be "*branded Kenyan*." The farmers raised concern that even though Kenya is the largest exporter of cut flowers in Africa and commanded a huge share of the EU market, the country had not bred its own flowers and still relied heavily on growing imported varieties.

c. Exploitation of small-scale exporters by middlemen

Small-scale flower farmers and exporters have difficulties accessing the international export market due to stringent phyto-sanitary standards, high freight costs, lack of knowledge of these markets amongst other constraints. This has created room for middlemen who enter into loose agreements with farmers to buy their flowers or help them access the export markets. Farmers narrated numerous challenges they faced with these unregulated middlemen including low buying prices and failure to honour agreements (failing to collect produce) leading to huge losses by the farmers. The farmers stressed the need to form cooperatives to help them improve their bargaining

positions and urged the government to facilitate the formation of these cooperative societies. The small-scale farmers further recommended that they be facilitated to negotiate legally binding contracts with the middlemen and ensure they were not exploited when entering into such agreements.

d. Lack of research information

The farmers decried the lack of easily accessible information on various flower growing aspects including; knowledge on flower varieties per ecological zones, production technologies and marketing. This lack of information partly explains why farmers turn to international companies for solutions. The farmers strongly recommended the establishment of a *Floriculture Center* with branches in the major growing areas to act as a one-stop shop where farmers could find information on all the flower growing aspects. The farmers further suggested that this Center should be designed in a manner that would allow farmers to display their innovations and share their knowledge and information with other farmers as well as scientists and researchers. In addition, the farmers recommended that brochures containing research findings be made available and in local languages.

5.0

Research Priorities: A Farmer's Agenda

For any research activity to be useful, it must be sensitive to local needs and priorities as well as allow ownership of its agenda by the intended beneficiaries. In the case of floriculture research, farmers and exporters are the *key stakeholders* and their views should help inform research decisions. During the consultative meetings in the major growing areas (Thika, Limuru and Naivasha) farmers identified and prioritized their research needs. They also suggested solutions to some of the challenges facing the industry. Table 1(opposite page) shows the areas identified and the steps the farmers have suggested for the research community as well as the policymakers.

Table 1: Farmers' research and training priorities

Problem Area	Problem Description	Farmers' Suggested Solution
Pests and Diseases	<ul style="list-style-type: none"> - Farmers lack knowledge and adequate information on alternative bio-control methods for pest control 	<ul style="list-style-type: none"> - More research on available, affordable, effective bio-control methods - Training on relevant pest control methodologies and options of pest control.
Development of new/ indigenous varieties	<ul style="list-style-type: none"> - Farmers over-reliance on same flower varieties since the early 1990s - The potential of local biodiversity is not being fully harnessed/exploited - Kenya over-reliance on imported varieties yet the country is a key exporter of flowers 	<p>Research should focus on identification and testing of different flora for potential use</p> <ul style="list-style-type: none"> - Development of indigenous varieties for commercialization; collect local germplasm, improve them and test in overseas markets. - Harness indigenous knowledge on wild flowers within local communities, document and test them - Breeders should be supported to come up with new varieties and get a "Kenyan brand"
Post harvest handling	<ul style="list-style-type: none"> - Lack of post-harvest handling knowledge - High post harvest losses - Lack of adequate, accessible facilities and capacity 	<ul style="list-style-type: none"> - Training of farmers on post harvest handling techniques and practices - Conduct research on alternative, affordable cooling, packing and storage methods - Conduct research on enhancing the post harvest quality of different flower types
Marketing	<ul style="list-style-type: none"> - Exploitation by middlemen/brokers - Lack of awareness of international trade agreements - Lack of information on market trends/ requirements - Inability to meet market standards/regulations - Branding and brand identity (need to develop marketing 'slogans' for Kenyan products) 	<ul style="list-style-type: none"> - Enhance capacity of farmers to sign/enter into binding contracts with middlemen - Educate farmers on relevant international trade agreements such as the Lome IV Convention, Economic Partnerships Agreements (EPAs) and WTO) and their implications - Organize regular forums to sensitize farmers on market trends, requirements and standards - Research on changing market trends, preferences and requirements

<ul style="list-style-type: none"> - Lack of domestic market for flowers 	<ul style="list-style-type: none"> - Increase farmers' access to ICTs to enable them obtain market information through the internet - Develop a Kenyan brand/slogan for Kenyan flowers - Conduct research to quantify the local demand/market and develop it for local varieties
<p>Information Dissemination</p> <ul style="list-style-type: none"> - Farmers are not exposed to research findings - Lack of information on flower varieties suitable for different agro-ecological zones- lack of updates on the new innovations in products and farming techniques - Inaccessibility to information in rural areas <p>Inputs</p> <ul style="list-style-type: none"> - Poor skills in fertilizer and technology applications - Water catchment areas getting destroyed due to bad farming methods - Farmers do not know which fertilizers to use and when to apply them - High input costs, such as, seed and inorganic fertilizers - Inadequate clean planting material techniques, protection of catchments areas and chemical use; irrigation equipment and methods 	<ul style="list-style-type: none"> - Disseminate research findings widely through non-technical brochures and in local languages - Set up a floriculture center with branches in major growing areas - Set up information desks in the major growing areas - Hold regular meetings/interactions between researchers and farmers - Tap, document and disseminate farmers' discoveries and indigenous knowledge <p>Information Dissemination</p> <ul style="list-style-type: none"> - Research on and train farmers on efficient fertilizer use, water harvesting culture and certified seeds - Improve access to affordable and reliable soil pH analysis and pest analysis advisory centers - Development of indigenous materials into pesticides - Develop biological methods/plant extracts to reduce the excessive pesticide use - Research on water use efficiency for different flower types

6.0

Other Non-research Concerns

There are other non-research concerns of flower farmers which came up strongly during the consultations. They relate to government policies affecting floriculture, input prices and supplies and the needs for infrastructural development. Table 2 (next page) summarizes these concerns and the farmers' recommendations.

Table 2: Farmers’ non-research concerns

Problem Area	Problem Description	Suggested Solution
Government support	<ul style="list-style-type: none"> - Government is aloof to small-scale farmer problems - High costs of production/inputs - High taxation (flower farmers are exposed to multiple of taxes) - Strong shilling affects exports/instability of prices 	<ul style="list-style-type: none"> - Government to set up an audit system for farmers and certify those who attain these standards - Government to set up and enforce quality standards - Harmonize and reduce taxation on flowers - Government to formulate a market-driven curriculum in educational institutions to support the industry - Government to formulate policies and frameworks to facilitate e-commerce - Government should facilitate small-scale farmers to attend local and international exhibitions and trade fairs - Government should support manufacturers to produce cheaper local fertilizers - The Central Bank of Kenya should regulate the appreciation of the shilling against major currencies to stem losses
Infrastructure	<ul style="list-style-type: none"> - Few/lack of cooling facilities for small-scale farmers - High cargo/freight and handling charges - High electricity costs - Poor road and rail network 	<ul style="list-style-type: none"> - Create conducive environment for investment in freight services - Local Authorities to maintain all feeder roads - Cooling facilities to be established at farm collection points to prevent quality deterioration - Harness solar energy for use as alternative source of heating during cold nights, or source of energy
Financing / Credit facilities	<ul style="list-style-type: none"> - Lack of farmer-friendly products financing/ credit institutions - High interest rates on loans from commercial banks 	<ul style="list-style-type: none"> - Farmers should be facilitated to form savings and credit cooperatives (saccos) to offer soft loans to them - Banks should have innovative products tailored to the needs of the industry

7.0

Survey and Comparisons of Farmers' Priorities with Current/On-going Research in Kenya

It is noteworthy that KARI has begun involving stakeholders and intended beneficiaries in setting the institute's research agenda. KARI conducted its first priority setting workshop in 1996 and more recently in 2005. This workshop identified key constraints affecting smallholder flower farmers as inadequate supply of clean planting material, obsolete flower varieties, lack of appropriate production technology and poor post-harvest handling.

The institute then embarked on research to address these constraints structured along the following themes: production (crop management, crop protection and post harvest handling) and varietal development.

In crop production, technologies for various flower crops (gladiolus, arabicum, ornis, erygium, lilies and gerbera) were developed and disseminated to more than 2000 flower farmers through demonstrations, field days, field schools and training in Central and Eastern provinces in Kenya. Thirty seven (37) varieties of lilies (Oriental, Eastern and Asiatic) were introduced from Europe and evaluated. Out of these, ten (10) varieties have been recommended for commercialization. A further twenty two (22) varieties of gerbera were introduced and their performance tested both on-station and on-farm and six (6) varieties were released for commercialization. Nine (9) varieties of gladiolus were introduced and evaluated and six (6) varieties released for commercialization.

Research in crop management technologies has concentrated on determination of spacing and nutrition requirements for a variety

of flowers, while major insect pests and diseases have also been identified and documented. Integrated pest management (IPM) options for the control of soft rot disease in flowers was developed as was a tissue culture propagation protocol for lilies.

Floriculture research in Kenyan Universities:

Floriculture research is being done in various Kenyan Universities including: the University of Nairobi, Egerton University, Moi University, Maseno University, Jomo Kenyatta University of Agriculture and Technology and Kenya Methodist University.

A brief survey on current and on-going research work at the universities revealed that some of the research projects carried out in various universities include:

- Effect of neem and aloe extracts on powdery mildew on roe plants (Egerton University)
- Effect of gibberellic acid, shade and vernalization on productivity of *Ranunculus asiaticus* (*Persian buttercup*) grown in the Kenyan Highlands (Egerton University)
- Intercropping roses and spider plant to control spider mites on rose plants (Thesis; Egerton University)
- Survival of propagated roses (*Rosa hybrida*) as affected by age and storage periods of cut-wood (Maseno University)
- The effectiveness of glyphosates as an inhibitor of tropic responses in cut roses (Maseno University)
- In vitro culture on lilies-Project (JKUAT)
- Control of Erwinia Soft Rot in *Zantadeschia* (JKUAT)
- Calla Lily in vitro culture for Hatabor Rainbow Bloom - Limuru (JKUAT)
- Evaluation of different propagation media and techniques for ornamental crops (Moi University)
- Domestication of indigenous plants for use as ornamental crops for both small- and large-scale farmers (Moi University)



Research Priorities for Kenya's Cut-flower Industry: Farmers' Perspectives

- In vitro propagation and gene manipulation of ornamental crops (Moi University)
- Proposed research: The use of medicinal plant extracts as biopesticides (Kenya Methodist University)

8.0

Conclusions

a. Policies

The government should target/harness the latent potential of small-scale flower farmers/exporters through well packaged policy incentives. Kenyan small-scale farmers face a different set of challenges from the large scale farmers and the “one-size-fits-all” policies for the industry may not be the most effective ways of promoting the industry. Whereas large-scale producers/exporters have overcome most of the production constraints and are focusing more on marketing/markets, the small-scale farmers have a wide array of problems that can be better tackled through policies focused and targeted at their special needs.

b. Research

A comparison between the farmers’ research needs vis-à-vis the ongoing and current research reveals that the public research systems emphasize more on crop production and pests and diseases while the farmers’ agenda is much broader. A quick scan through the research in public research institutions showed that:

- i. Kenyan small-scale farmers yearn for a product/variety branded “Kenyan” and have been attempting to domesticate wild flowers. Besides, the farmers hold valuable indigenous knowledge on the pesticidal effects of some flowers and trees. Biological control methods are also discovered continuously through the farmers’ interaction with nature. The government and research community should tap and develop this knowledge. In so doing, they must ensure that the “holders of this knowledge”- the farmers - are adequately recognized and compensated.

- ii. Research on inputs seems narrowly focused on seeds and plant media. It should be recognized that issues such as fertilizer combinations and efficiency, water use efficiency; equipment/methods, soil pH analysis amongst others constitute inputs to the farmers and research should be geared towards improving them too.

c. Markets

There's little focus on market research for the industry. Indeed, even the local/domestic market for flowers is not quantified even though a survey conducted by KARI in 2004 estimated it to be approximately Kshs. 300 million annually. In the same year, HCDA estimated that small-scale farmers exported flowers worth Kshs. 500 million accounting for 3 per cent of total flower exports.

It is imperative that the small-scale farmers are linked to markets (both domestic and export) in order to thrive. Indeed, a recent study by Muthoka (2006) has concluded that, "small-holder summer flower production can only be profitable if the farmer is able to get access to relevant information that will assist in making the decisions on what to produce and when to produce". Information on market trends demands, tastes and preferences, transactional costs and prices should be easily available and updated.

Market access is closely related to phyto-sanitary compliance and proper (pre- and post-harvest) handling of flowers. As yet, there is minimal emphasis on post-harvest handling and training for the small-scale farmers. This constitutes an opportunity for the research and training institutions.

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