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# Proceedings and Recommendations of the 14<sup>th</sup> Meeting of the ‘Latin American Association for Cotton Research and Development’ (ALIDA)

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The 14<sup>th</sup> ALIDA meeting was held at Maceió, Brazil, on August 28<sup>th</sup> 2017 on the theme ‘*New technologies for Boll weevil management*’. The meeting was organized jointly by the International Cotton Advisory Committee (ICAC), the Food and Agriculture Organization of the United Nations (FAO), the Brazilian Agricultural Research Corporation (EMBRAPA), Brazil and the Brazilian Cooperation Agency (ABC / MRE).

## Background

The Latin American Association for Cotton Research and Development (ALIDA) was formed in 1986. Thus far 14 network meetings were held in various countries of the region in Argentina (1986, 1997, 2010 and 2011), Bolivia (1999), Brazil (1991, 2003 and 2017), Colombia (1993, 2005 and 2013) Nicaragua (1995), Paraguay (2001) and Peru (1988). The primary objective of ALIDA is to facilitate active interactions amongst researchers of Latin America and also with experts of other countries to discuss challenges, share experiences and knowledge with an aim to strengthen the Latin American cotton sector.

## Inaugural Session

In her opening remarks, Mrs. Cecilia Malaguti (ABC/MRE) described IBA and ABC initiatives under the Trilateral South-South Cooperation to strengthen the cotton sector in Africa, Latin America and the Caribbean. Ms. Adriana Gregolin (FAO) welcomed the participants and emphasized the need for combined efforts of ALIDA and FAO projects for the progress of cotton sector in Latin America. In his presidential address, Dr. Sebastião Barbosa (EMRAPA) described ALIDA as a platform for effective exchange of knowledge and research findings for the progress of cotton research in the region. He said that the boll weevil and bollworm are of serious concern to the major cotton growing countries in Latin America and ALIDA can address these problems effectively. Dr. Keshav Kranthi (ICAC) highlighted the rapid strides made by the Brazilian cotton for yield enhancement and the experiences of USA and Mexico in boll weevil eradication which he said could be considered as brilliant case studies to prepare developmental plans for the benefit of Latin America. Ms. Lorena Ruiz (ICAC) reiterated the importance of cotton in the world economy and enlisted the challenges facing Latin America. Engineer Eduardo Román facilitated and compered the meeting.

## Participants

Thirty-six participants from nine countries (Argentina, Brazil, Bolivia, Colombia, Chile, Mexico, Paraguay, Perú and USA) attended the meeting.

Sebastião Barbosa - EMBRAPA, Brazil;  
Liv Soares – EMBRAPA, Brazil;  
Joao Henrique Zonta - EMBRAPA, Brazil;  
Fatima Grossi, EMBRAPA, Brazil;  
Raimundo Braga - EMBRAPA, Brazil;  
Odilon Reny - EMBRAPA, Brazil;  
Franklin Suarez – MINAGRI, Perú;  
Marité Nieves – INIA, Perú;  
Jose Arturo Távara – INIA, Perú;  
Eduardo Barragan – CORPOICA, Colombia;  
Sofia Ortiz – MARD, Colombia;  
Jairo Palma – CONALGODON, Colombia;  
Juan Campero – FEDEPA, Bolivia;  
Juan Carlos Cousiño – IPTA, Paraguay;  
Moisés Santiago Bertoni – IPTA, Paraguay;  
Mario Mondino – INTA, Argentina;  
Guillermo Carrera – Ministry of Production, Argentina;  
Carlos Oscar Mitre – A.P.A.Z IV, Argentina;  
Silvia Navarro – UTALCA, Chile;  
Jesús García – SENASICA, Mexico;  
Stacy Plato – Plato Industries, USA;  
Scott Plato – Plato Industries, USA;  
Adriana Gregolin – FAO-RLC;  
América González – FAO-PY, Paraguay;  
Eduardo Román – FAO-CO, Colombia;  
Gonzalo Tejada – FAO-PE, Perú;  
Ronald Franz Quispe – FAO-BO;  
Joelcio Carvalho – FAO-RLC, Chile;  
Emmanuel Salgado – FAO-RLC;  
Palova Souza – FAO-BR, Brazil;  
Eliane Faria – FAO-BR, Brazil;  
Aurelie Duray – FAO-RLC;  
Cecilia Malaguti do Prado – ABC;  
Ana Elisa Larrarte – ABC;  
Lorena Ruiz – ICAC, Washington DC  
Keshav R. Kranthi – ICAC, Washington DC.

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## Session-1

### *Sustainable Cotton Development in Latin America: The Role of ALIDA*

Dr. Sebastião Barbosa, EMBRAPA, Brazil

ALIDA needs to set up an action plan with specific focus on pest management. Boll weevil is a major problem in Latin America. After its arrival in Brazil, the cotton scenario changed. Though the area declined from 4.0 million to 1.0 million hectares, new technologies were used to enhance the yields from 300 kg to 1800 kg per hectare. Even under rainfed conditions, yields reached 2000 kg/ha in Mato Grosso. High productivity and premium quality have become the hallmarks of Brazilian cotton. The Brazilian Cotton Growers Association (ABRAPA) is very strong with capabilities to strengthen the cotton sector. Boll weevil can be menacing. For effective boll weevil eradication in Latin America, there is a need to develop simple science-based strategies that must be disseminated through participatory training programs and implemented via area-wide-community network programs in an organized manner across countries. There is a need for trained people, laboratories, experimental fields and R&D programs. Some of the key components of the management strategies are 1. Short-season varieties 2. Destruction of stubbles 3. Uniform planting dates 4. Regular monitoring 5. Need based appropriate chemical sprays and clean cultivation. Organic cotton cultivation can be risky due to boll weevil infestation. ALIDA should play a major role in exchange of information, sharing of experiences, organizing participatory training at the field level and coordinating activities between Government agencies, NGOs, producer organizations and farmers.

EMBRAPA is introducing three new transgenic varieties, one which produces long fibres. EMBRAPA and ABRAPA are collaborating to develop cotton tolerant to herbicides, diseases and nematodes. The program is also focusing on production practices and soil management. Some of the challenges are related to development of machinery for small scale farming systems, weed management, reducing cost of production and sustainability especially in dryland farms. The ICAC, FAO and ABC must facilitate cooperation between Latin American countries to enhance yields with reduction in manual drudgery and cost of production.

## Session-2

### *Overview of the Cotton Sector in Latin America*

Mr. Joelcio Carvalho, FAO-RLC

There is a need to develop strategies for crop rotations especially in small-scale farming systems to ensure subsistence of food crops and improvements in soil health and ecology. The major problems in the region are related to limited access to finance, market information, technical assistance and inadequate knowledge. A good farmer is not the

one who produces the most, he is the one who best knows how to sell and in the best condition. The FAO together with ICAC developed indicators to measure social, environmental and economic performance (SEEP) of cotton production systems. Attempts are being made to collect and collate baseline data on SEEP indicators on a regional basis so as to ensure proper interventions involving Governments and institutions to work towards sustainable farming systems.

Dissemination of information and transfer of technologies depend greatly on the basic level of education in the rural sector and participation of women. Though decisions are made together in the family, the participation of women is 7% Bolivia, 5% in Paraguay and only 3% in Peru.

In Latin America there is limited interaction among the different actors of the cotton value chain and limited access to cotton varieties adapted to each agro-ecological zone. In Bolivia, Colombia, Paraguay, and Peru many producers manage the crop without access to financing; most of the times producers seek finances from private banks, stockholders with stipulated conditions and fixed prices. Producer associations can make a difference in decision making, planning of the production and sale. Several other initiatives include proposals for productive models, training camps, adaptation of technologies for certification and regional events for institutions, technicians and farmers.

## Discussion

- Ms. Adriana Gregolin: The yields in Brazil are high and low in other countries of Latin America. Can there be a paradigm shift to enhance yields in the region based on lessons from the success story of Brazil?
- Dr. Keshav Kranthi: Lessons from Brazil are very important, not only for Latin America, but for the rest of the world. High yields can be obtained through a combination of short season variety + compact plant architecture + planting pattern and good agronomic management. Great care must be exercised in optimising chemical inputs and GM cotton. Organic farming is possible; but, it must be based on robust scientific strategies using varieties that are developed to sustain organic practices.
- Dr. Sebastião Barbosa: A new paradigm would mean different things for different people. Technological development, modernization and access to information will be the key elements in the present and the future.
- Dr. Eduardo Barragán: Innovation unites research and development. Innovations generate knowledge and money. Linking producers with knowledge and markets is very important.
- Dr. Juan Campero: ALIDA can play an important role in transfer of technologies with active participation of member and non-member countries of the ICAC.

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## Panel Discussion On 'Boll Weevil'

Chair: Dr. Sebastião Barbosa, EMBRAPA

Dr. Raimundo Braga Sobrinho: Boll weevil arrived and spread across Brazil after 1983, thereby changing the cotton scenario in the country. The ideal conditions of high temperatures and high humidity favoured establishment and rapid dispersal. From being a major exporter, within a decade of boll weevil damage, Brazil became the world's largest cotton importer. But EMBRAPA and other institutions reversed this soon through new technologies, to revive the cotton sector in Brazil, to make it into a major cotton exporter again. The boll weevil damages fruiting parts all through the season. It has about seven generations per year and reaches menacing proportions. After cotton harvest, the weevil seeks refuge in stubbles and ratoon plants thus obtaining food all round the year. Apart from ideal weather and availability of continuous source of food, lack of regional monitoring, low participation of producer organizations and low adoption of IPM contribute to higher levels of incidence. Management strategies short-season varieties, regular monitoring, use of pheromone traps and appropriate chemical control. It would be important to implement the IPM programs on area-wide scale though collective actions of producer groups across Latin America.

Dr. Keshav Kranthi: A few recent research publications have proposed new arsenal for boll weevil eradication. Two papers from EMBRAPA describe the development of new generation transgenic cotton varieties using cry10Aa genes and identification of double stranded RNA (dsRNA) for gene silencing of chitin synthase-2. Expression of Cry10Aa in transgenic plants was found to cause 100% mortality. Ribonucleic acid interference (RNAi) using chitin synthase dsRNA also resulted in 100% mortality. Therefore, a combination of both events could be expected to be not only highly effective but also sustainable in delaying development of insect resistance to the combination of the two events, mainly because the two approaches have different modes of action. Deployment of the two event-stack combined with the existing boll weevil eradication strategies would immensely strengthen IPM in Latin America. The CpTi (cowpea trypsin inhibitor) based transgenic cotton may be tested for possible efficacy on the boll weevils to explore additional arsenal for control.

Mr. Jesús García Feria: In Mexico, The National Service for Agro-Alimentary Public Health Safety and Quality (SENASICA) regulates management of boll weevil, pink bollworm and the bollworm complex. The producer is obliged to follow a specified planting date, destruction of stubbles within 10 days of harvest and is obliged to have a technician to control these regulatory pests. The binational program which began in 2002, involves the Mexican government, the USDA, state governments, auxiliary plant health agencies, authorized phytosanitary professionals and producer organizations. SENASICA, Government and farmers contribute a third each towards pest control. The Government

institutions, SENASICA, USDA and the Secretariat of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) monitor the program, evaluate results and analyze them for later execution, supervision and follow-up. The main boll weevil eradication strategies include regular monitoring and net-working through weevil-expert, uniform planting dates, destruction of stubbles, pheromone based trapping and four spray applications: two in spring and two to kill diapausing insects. The participation of plant health auxiliaries and producers is vital for control of the weevil. Despite initial apprehensions, the program was implemented on an area-wide basis with active involvement of the Government and all stakeholders thereby achieving successful results. Since 2016, 85% of the cotton area in Mexico is purported to be free of the boll weevil.

Dr. Mario Mondino: In Argentina, the major aim is to reduce the incidence and thereafter eradicate the boll weevil. About 82% of the cotton area is rainfed. This entire area is under the threat of the boll weevil. The objectives are to generate validated models of institutional and technical management for boll weevil control and develop action plans to be organized by a council of cotton farmers, managers and technical assistants, and a technical committee for joint implementation of control measures by farmers. Some of the important management measures are, uniform sowing dates in a narrow-window period, regulating optimum plant density, timely defoliation, destruction of stubbles immediately after harvest, prevention of ratoon emergence, regular monitoring and selective application of insecticides according to damage at specific phenological stage based on economic thresholds. INTA would actively consider developing transgenic technologies using Cry10Aa and the CpTi from China. The Provincial Plant Health Committee (COPROSAVE) designs an annual operational plan as individual farmer based 'property framework' and a 'zonal framework' that is jointly coordinated by a group of technicians using latest technologies including satellite imagery. Registered cotton producers are mandated to implement pest control actions based on the precise locations and extent of infestation. Small producers with less than 10 hectares are required to set up physical barrier called 'boll weevil attract and control tube' 30 days prior to planting to prevent weevils from entering the fields and subsequent to harvest to prevent weevils going to refuges.

Dr. Maria Fatima Grossi de Sá: As of now, boll weevil resistant cotton varieties are unavailable, thereby warranting the need for 18-25 insecticide applications per season accounting for 25% of the production cost. Alternative strategies include rigorous IPM and transgenic varieties. The biotechnological approaches include plant defense proteins, exploring the genome and transcriptome in the boll weevil to search for unique targets for gene silencing, search for new regulatory sequences and promoters. Ribonucleic acid interference (RNAi) for gene silencing is being used to target house-keeping genes that are unique to the insect species. Gene silencing is being attempted by using double stranded (dsRNA) through nano-particle

sprays. Transgenic plants developed at EMBRAPA express 12-18 ppm of Cry10Aa leading to 90-100% mortality of the weevils. Field trials will be conducted at Mato Grosso. Micro-injection dsRNA of *chitin synthase-2* caused gene silencing and a decrease in haemolymph proteins thereby causing 100% mortality of boll weevils. At lower doses of dsRNA of chitin synthase-2 and a neuropeptide, infertile eggs were laid by the treated females.

## Discussion

- Dr. Liv Soares Severino: Do Africa and Asia have the boll weevil?
  - Dr. Kranthi: As of now there are no records of the cotton boll weevil in Asia and Africa.
  - Ms. Adriana Gregolin: In Mexico, how do producers adopt practices and what role do technicians play? In Argentina, what are the main difficulties in the field?
  - Mr. Jesús García: in Mexico implementation is voluntary, but the farmer pays only one-third of the cost, which encourages them to participate. The companies interact with farmers. The technician is dedicated to the sampling of pests and complements our information; traps are used extensively.
  - Dr. Mario Mondino: In Argentina, the main constraint is for the small producer with less than 1 hectare farm. They are provided with seed, machinery and technical assistance to help them get organized.
  - Ms. Adriana Gregolin: What was the investment in the Cry10Aa transgenic project and how many researchers work in the program?
  - Dr. Fatima Grossi: The team has eight researchers and a few technical assistants.
  - Dr. Sebastião Barbosa: The research program has a few graduate students. Investment is actually less for a problem of this kind. Some farmers resort to 40 insecticide applications per season. Expenditure for boll weevil control could reach US\$300 in some years.
  - Dr. Marité Nieves: How is compliance of planting date and removal of stubbles ensured in Mexico and Argentina? In Peru, though stubble clearance is mandatory, there is very less compliance.
  - Dr. Mario Mondino: though it takes time, fines are imposed on producers for non-compliance.
  - Mr. Jesús García: In Mexico, the producer signs that if he does not destroy the stubble he pays more money. Though, it is difficult to comply with the legal norm, one mechanism is to regulate the irrigation dam based on compliance.
  - Mr. Jairo Palma: The Colombian Agricultural Institute – ICA in conjunction with cotton cooperatives, exercise control by retaining 8% of the value of the seed cotton.
- Once the farmer certifies that the destruction of the stubble was completed, the farmer can get the retained value back, if it doesn't it is used as a fine for non-compliance.
- Dr. Sofia Ortiz: Colombia has a strict regulation with the sale of seed, sowing time, for each of the producing areas. However, some farmers are imposed fines while some find ways to evade it.
  - Mr. Eduardo Roman: *Bacillus thuringiensis* (Bt) is being used by EMBRAPA in Brazil and Argentina. Biological control should also be considered by farmers as in some cases it could be cheaper and the only management option.
  - Dr. Fatima: Bt strains have a large toxin repository and many of them are different from each other in their modes of action.
  - Dr. Sebastião Barbosa: Investment in science and research is most important for all countries if they are serious in finding robust solutions to intractable problems.

## Panel Recommendations

Chair: Dr. Sebastião Barbosa

### Dr. Sebastião Barbosa

- ALIDA should work towards optimizing and maximizing resources.
- There is a need to develop precisely focused collaborative programs and for a specific meeting in relation to the science and the weevil.
- Success stories and experiences must be shared among countries.

### Dr. Raimundo Braga

- ALIDA will need more support from the ICAC to enhance communication amongst researchers through ICT.
- Each country needs to review their strategies against the boll weevil. Protocols that are feasible should be disseminated to farmers.
- Trainings needs must be harmonized for technicians.
- Weekly reporting of production practices will be needed to synchronize planting dates.

### Mr. Franklin Suarez & Mr. Gonzalo Tejada

- In Peru the boll weevil is *Anthonomus vestitus*. Due the variable weather conditions, the boll weevil is problematic only in some years. In Senasa, the weevil network has detection points, using pheromone traps, in the port of Callao and on the border with Bolivia. Insecticide sprays in Peru do not exceed 6-7 applications per season for all pests.

### Mr. Juan Campero

- Though farmers in Bolivia resort to control the boll weevil, there is doubt on whether it is *Anthonomus grandis* or *A.*

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*vestitus*. The cotton varieties are being changed now as part of boll weevil management.

Mr. Santiago Bertoni

- In Paraguay, the cotton area declined from 600,000 hectares to 10,000 hectares, thereby leading to reduction in boll weevil populations. Bollworm *Heliothis* species is a major problem for which farmers spend about US\$100 on control methods. First generation Bt-cotton is being used now.

Ms. Adriana Gregolin

- A discussion page on the boll weevil may be initiated by the ICAC/ALIDA/ICRA, with updated information on the boll weevil.
- Each country must organize awareness meetings and training of producers and technicians to control the weevil.
- There is a need to raise concepts of training and biotechnology for boll weevil management.
- Online courses on cotton production technologies must be initiated.

Dr. Fatima Grossi

- Symposia with specific focus on boll weevil management and biotechnological approaches will be conducted within the cotton congress 2018 to facilitate interaction amongst researchers of the Latin American countries

Ms. Silvia Navarro & Dr. Gonzalo Tejada

- Collaboration between institutions can enlarge the scale to make projects more efficient.

## Session-3

### *ICAC perspectives - Status and Challenges of Cotton in Latin America*

Ms. Lorena Ruiz, ICAC

The cotton area in Latin America was 5.3 million hectares in 1985, but, declined to 1.3 million hectares in 2001-02. Currently the area is about 1.5 million hectares with majority of the area in Brazil. Other profitable crops have replaced cotton. There is a correlation between COTLOK-A index and the cotton area. The historical average of production in Latin America is 1.6 million tons, but 2.5 million tonnes were produced in 2010-11. Brazil accounted for 55% of the total cotton produced in Latin America in 1986-87, but the contribution increased to nearly 80% in 2016-17. The average yield of Latin America increased from 330 kg/ha during the mid 1980s to an impressive 1,170 kg/ha that remained stable over the past 9 years after 2007. Much of this progress must be attributed to the technological progress in Brazil. It is important to compare Latin America with the rest of the world, to understand how far we can go.

A baseline is drawn 98-99 to show how yields in Latin

America exceeded the rest of the world with a difference of 420 kg of fiber per ha. The yields vary significantly among countries in the region, with Brazil and Mexico as the largest producers, followed by Colombia, Peru and Argentina. Until 2001, Brazil imported cotton, but became a net exporter after 2003. Brazil is currently, the fifth largest cotton producer, 4th largest cotton exporter and 8th largest consumer. It occupies the 3rd global rank in yields with 1700 kg fiber per ha. Mexico produces cotton that caters to 50-70% of the domestic consumption with rest of the cotton imported from the US. Argentina produces cotton that is in excess of its domestic consumption, and exports the surplus to other countries such as Indonesia, Colombia and Turkey.

The national consumption has been stable for the past 6 years. Colombia produced 128,000 to 159,000 tonnes of cotton in 1990-92, which was 20-30% higher than its domestic consumption. However, production levels declined to 8000 tonnes by 2016. Consumption was 110,000 to 112,000 tonnes during 2003 to 2010, but declined by 50% by 2016 due to competition from Asia. Cotton is now imported from USA and Argentina. Cotton consumption in Peru declined by 55% over the past 10 years, from 125,000 tonnes in 2006 to 57,000 tonnes in 2016. Production declined from 80,000 tonnes in 2006 to 20,000 tonnes in 2016. Production in Paraguay declined from 264,000 metric tonnes in 1990 to 5000 tonnes in 2016. Paraguay was a major exporter in the 1990s. Production in Bolivia declined from 28,000 tonnes in 1995 to 1000 tonnes in 2001. Consumption also declined by 70% from 10,000 tonnes in 2007 to 3000 tonnes in 2016. Thus cotton production underwent radical changes over the past 2-3 decades. Due to the reduction in area, many of the local varieties were lost and cost of production increased due to introduction of less adapted varieties.

The main challenges are, the scale of planning dwindled and sectoral planning became unsustainable, mainly due to frequent changes in policies as influenced by change in Governments. Though much is spoken about the importance and consumption of cotton, synthetic textiles are commonly used. Cotton must be promoted because it is a natural product and provides livelihood to millions of producers across the globe. Synthetic fibres are unnatural and cause environmental contamination through micro-fibres. World consumption of cotton has been increasing; but cotton's market share is forecast to continue to decrease from 68% in 1960 to an estimated 23.0% by 2025. Though majority of the world's cotton is being produced using technologies that are common to agriculture, cotton is singled out by vested interests to malign its reputation. The ICAC is focusing its efforts towards enhancing the sustainability of cotton production systems.

## Discussion

- Dr. Sebastião Barbosa: Brazil has shown that integrated farming can conserve and save water. By increasing yields more cotton can be produced from less area and degraded pasture lands can be reclaimed for agriculture.

- Ms. Silvia Navarro: Digital communication with economies of scale must be used to promote natural fibres.
- Mr. Jairo Palma: the cost of production in Colombia has been on an upward trend. The cost of the seed, especially GMO, is very high. There is only one distributor of cotton seed. This has created a huge problem to farmers as they have to accept the conditions imposed and the varieties offered by the seller.
- Ms. Lorena Ruiz: the ICAC publishes cost of cotton production once every three years. The information is part of ICAC's Technical Section and the report includes information by country in USD dollars. It is important to make cotton more profitable by reducing the cost of production, which in turn would make it more competitive to synthetic textiles.
- Mr. Eduardo Roman: Cotton is now associated more with surgical products as synthetic textiles are gaining ground.

## Session-4

### *FAO Perspectives for Sustainable Cotton in Latin America*

Ms. Adriana Gregolin, FAO

The South-South Cooperation for sustainable cotton in Latin America is an innovative initiative. Sustainable cotton production using GMO or conventional varieties through optimization of resources should be based on equitable social aspects for profitable income generation. It is important to work on the issue of efficient marketing with a perspective of inclusive territorial development and poverty reduction. The reality is that about 80% of the Latin America and Caribbean sector are family farmers, with farm size of less than 3 ha. The regional FAO - ABC - IBCS project addresses this perspective. The public-private technical institutions in the project countries develop institutional capacities to strengthen the cotton sector by working closely with farmers. The project is framed within the strategic objectives of FAO to reduce poverty, promote integrated agricultural systems, and make agriculture more productive and sustainable using four main concepts of strategic alliances, social innovation, sustainable technologies and inclusive markets. The main challenges for the Latin American countries relate to production constraints, soil health, conservation practices, crop management, density of planting, pest control, financing, low access to credit, production of seeds that has decreased and limitations for a quality seed, machinery for small areas and technical assistance not specialized in cotton. In Paraguay, there is collaboration with EMBRAPA to develop sustainable technologies, production of cotton seeds and associated crops and to conduct training of technicians and professionals of the sector. In Peru, efforts are being made to strengthen producer organizations, support research, produce quality seeds and

promote machinery for small farming systems. In Colombia, there is emphasis on producer organizations, strengthening research, professional training, commodity competitiveness and facilitation of access to credit. The overall challenges for actions relate to strategic alliances to strengthen institutional capacities, sustainable technologies for better research and obtaining quality varieties, crop management, social innovation to increase associativity, facilitating dialogues between producers wherein the private sector must be involved. Additionally, inclusive markets are important for the advancement of regulation of marketing conditions and ease of access to differentiated and niche markets. ALIDA is important to strengthen the capacities in the field as an autonomous group of researchers.

## Discussion

- Mr. Jesús Garcia: You need a different strategy to work with small producers, it is not the same to work with large producers.
- Dr. Raimundo Braga: Prevention of damage by the weevil is very important. Monitoring the cotton fields is as important as monitoring the refuges. The damages of boll weevil are not only reflected in higher cost of production, but also in lower yields.
- Dr. Sebastião Barbosa: While several International organizations believe that small farmers will not have the capacity to compete in the market, it is pertinent to understand that small farmer groups can make good profits through organized marketing. Migration of farmers to cities can be curtailed by giving them access to advanced information and technologies. Farmers should have the right to get the best available technology, including transgenic cotton.
- Dr. Juan Campero: Small farmers are becoming smaller over the years. They need assistance.
- Dr. Keshav Kranthi: About 10 million farmers cultivate 12 million hectares of cotton in India. Majority of them are small farmers. Though the average farm size is 1.2 hectares, the crop means annual livelihood for the family. With the recent advancement in communication through mobile phones, the small farmers also have access to technologies and market information even in the remotest of areas. They assimilate and adopt whatever adds value to their farming.
- Dr. Eduardo Barragán: Participatory research must be inclusive and effective. Rural extension goes beyond technical assistance and there is a need to work on territory perspectives. Information delivery is different for different sections of farmers. Despite whatever is disseminated, the farmer is very practical and takes what is useful for him.

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## Session-5

Working Groups: Actions to be Prioritized by ALIDA for 2017/2018

### Group-1

Three recommendations were finalized:

1. Technological innovation, with focus on exchange of genetic material, accessibility to quality seeds and integrated management programs such as the weevil.
2. Transfer and technological adaptation: Scientific knowledge that is generated must reach the farmers.
3. Promotion of cotton consumption: This is a priority issue due to the reduction of production areas in Latin America.

ALIDA activities can be made sustainable by working on common actions, to generate impact, to have a focal point in each country, to raise awareness of activities and work in coordination with other institutions such as ICRA to promote synergies. ALIDA will remain in force as long as it has resources, and that goes in the capacity to generate projects and thus give it visibility.

### Group-2

Eight recommendations were finalized:

1. The ICAC must issue advisories to members on market information for producers.
2. Opportunities to exchange seeds through societies and facilitate access to quality seed.

3. Harmonize regulatory criteria for new investigations of molecules for weevil control.
4. Standardize technical and scientific concepts.
5. Support technological innovation for the mechanization of small-scale farming.
6. Seek support from the IBA - FAO for funding for participation in future congresses.
7. Create the role of technical secretaries to coordinate national actions.
8. Strengthen collective actions for boll weevil management.

## Election of a New ALIDA Team

- Dr. Raimondo Braga, Brazil: Chair
- Dr. Mario Mondino, Argentina: Vice-Chair
- Dr. Eduardo Barragán, Colombia: member
- Dr. Santiago Bertoni, Paraguay: member
- Mr. Jesús García, Mexico: member
- Dr. Marité Nieves Peru: member
- Dr. José Arturo Távara, Perú: member
- Dr. Juan Campero, Bolivia: member

## Closing Session

Mrs. Cecilia Malaguti, Dr. Sebastião Barbosa, Ms. Adriana Gregolin, Dr. Keshav Kranthi and Ms. Lorena Ruiz acknowledged the contribution of Dr. Diana Piedra, ex-Chair of the ALIDA, welcomed Dr. Raimondo Braga as the new chair, the new team-ALIDA members and thanked all the participants for the useful interactive sessions.