

ANNEX 10

CABI-Central and West Asia Science Review Report

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1. Preface

I visited CABI's Central and West Asia Office (CWA) from 17-19 March 2015 as part of the overall Science Review, to review the work in Pakistan and the region. The terms of reference for the review are given in Annex 1 and a schedule of individuals met is given in Annex 2. This summary report provides a general overview of CABI in Pakistan, Afghanistan and the CWA region, followed by a brief assessment of CABI's current and future work on a thematic basis before looking at some key cross-cutting issues.

I would like to thank the staff of the CWA Office for the very frank and helpful discussions, and in particular Dr Babar Bajwa, the Regional Director, for arranging such an informative programme, for giving up so much of his time to discuss CABI's work with me, for accompanying me on visits to various officials etc., and not least for his generous hospitality.

2. Introduction

The CABI-CWA office covers a large region from Pakistan, through Central Asia and the Levantine countries of West Asia to the Arabian Peninsula. The office was created in 1957 as the Pakistan Station of the Commonwealth Institute of Biological Control. It was established on 3.6 ha of land provided by the Government of Pakistan in Rawalpindi, adjacent to the Pir Mehr Ali Shah Arid Agriculture University. After a series of name changes, it became 'CABI South Asia' in 2006 and then 'CABI Central and West Asia' in 2011 upon the establishment of a Centre for South Asia in India.

Since 1957 the CWA Centre has undertaken more than 230 projects with most of the early work focussing on the biological control of agricultural and forest pests. However, interest by the government of Pakistan in the biological control of forest pests has since waned, in spite of the continuing importance of several pests and diseases, e.g. pine cone borer. On the other hand, the programme has been able to expand into a number of new areas including integrated pest and crop management; agricultural development through the transfer of knowledge on good agricultural practices (especially through Farmer Field Schools, the Plantwise Plant Clinics and innovative ICT methods); the strengthening of sanitary and phyto-sanitary (SPS) measures; and the promotion of business and marketing skills.

From 2008 to 2013, the ruling Pakistan Peoples Party undertook a major devolution of power from the Federal Government to the Provinces by signing the 18th Amendment. Many key aspects of agricultural support were transferred to the provinces, with the central government retaining responsibility mainly for oversight and regulation including collecting and publishing agricultural data. During this period no new scientific research projects were begun and the only major new initiatives were in the provinces, primarily with the support of outside agencies such as USDA and the Aga Khan Foundation. These included a very successful project on the biological control of cotton pests. Since about 2013, however, the situation has improved substantially and the Pakistani Federal Government is again seeking CABI's assistance in a wide variety of areas, including scientific research.

Recent years have also seen a significant expansion of activities into Afghanistan, and the programme is now looking to expand its activities elsewhere in the region.

In line with its Terms of Reference, this review focuses on CABI'S science – primarily its scientific research and the interface between research and the delivery of knowledge. Activities that lack a specific research dimension have not been considered, including many projects in the area of ICT, trade and commodities, institutional strengthening and training at the farm and extension service levels.

3. CABI Theme: Invasive Species

3.1 Invasives

The importance of invasive pests, diseases and weeds is widely recognized in the CWA region. However, within Pakistan, work is hampered by the fact that responsibility for alien invasives rests with the Ministry of Environment, whereas the Ministry of National Food Security and Research (MNFSR), to which CABI reports, has a greater capacity to address the issue of invasives within the agricultural sector. The situation is exacerbated by the fact that the two ministries do not always see eye-to-eye. Nevertheless, CABI has carried out a large number of successful projects on invasives in the past and there is interest to expand this work in the future.

In recent years most of the work on invasives has focussed on arthropod pests, as little funding has been available for invasive weeds. However, the MNFSR is currently concerned about two weeds in particular, for which it is seeking CABI's assistance. These are a) parthenium (*Parthenium hysterophorus*) a damaging, toxic invasive weed from the neotropics, commonly found on farms, pastures and roadsides in Pakistan; and b) paper mulberry (*Broussonetia papyrifera*), an invasive tree from S.E. Asia having allergenic pollen and a very common urban weed – particularly in Islamabad. Providing funding can be secured, from the Pakistani government or elsewhere, CABI clearly has a lot to offer in developing appropriate solutions.

In addition to invasive weeds, officials from the Pakistan Agricultural Research Council (PARC) and MNFSR indicated that they would like to see CABI give priority to: further developing measures for managing mealy bugs; developing fruit fly free zones for citrus and mango (building on past successes); the control of citrus canker; and the control of Khapra beetle (*Trogoderma granarium*) in stored grains, building on the Phytosanitary Risk Management Programme that recently started in cooperation with USDA and Kansas State University.

The Big Push on invasives can clearly make a major contribution to the work in Pakistani and the CWA region as a whole, especially through bringing additional scientific back-up and support from the European Centres.

3.2 Integrated Pest and Crop Management (IPM and ICM)

The success of IPM measures introduced by CABI to reduce the damage caused by cotton mealy bug has led the Government of Pakistan to look for ways to reduce, and ideally minimize pesticide use more generally. IPM solutions are very attractive, as promoted through Plantwise and the Farmer Field Schools (FFS), and they receive strong vocal – and it seems increasingly financial - support from the government.

CABI increasingly talks about ICM rather than just IPM, and to the extent that there is a strong demand for this (which was not always clear in my discussion with government officials), CABI may need to examine its overall staff capacity in those

topics in which it is currently comparatively weak (integrated soil fertility management, water management etc.) and either seek to strengthen its own internal staff capacity or forge appropriate partnerships.

There appear to be good opportunities to expand the work on ecological aspects of IPM, including studies on host ranges, pest/environment interactions and measures for encouraging natural enemies. However additional staff strength – or outsourcing relationships – will be needed in these areas too. The present work is primarily being conducted by two PhD students looking at a) the use of *Trichoderma* to control pathogens in different soil types and b) host/plant/vector interactions in cotton leaf curl virus (CLCuV).

CABI is currently working on a major IPM project as part of the Better Cotton Fast Track Programme, funded by the IDH-Netherlands. This and various other projects appear to offer a good opportunity for research on the cost-effectiveness of IMP in general and biological control in particular, in relation to that of conventional pesticide use.

3.3 Biological Control

Biological Control is the foundation of the work at the CABI-CWA Centre and while this area remains among the most important, activities have been considerably reduced compared to the past. Much of the work on Biological Control has been kept alive over recent year thanks to the interest and support provided by USA and Canada, which have a major interest in identifying natural enemies of North American alien invasives. As a result, work on such Pakistani pests as Papaya Mealy Bug and Apple Codling Moth – that are important invasives in N. America - has received a boost.

An alien invasive pest that is currently of considerable interest to USDA is the Bagrada bug (*Bagrada hilaris*). While this is becoming a major pest of brassicas in the USA, it is only a minor problem in Pakistan as by and large it is kept under control by natural enemies. CABI clearly has a comparative advantage in helping to identify Bagrada predators and parasitoids for USDA and is well placed to make an important contribution. However, CABI should ensure that in all work that it undertakes that is essentially a service to others – especially to developed countries - all direct and indirect project costs are fully funded and ideally there should also be additional benefits for CABI e.g. through the acquisition of scientific equipment or staff training.

With respect to biopesticides, a number of S. Asian countries have biopesticide industries, including Sri Lanka, India, and Nepal. However this sector is relatively undeveloped in Pakistan. While CABI recommends the use of certain biopesticides through the Plant Clinics, there is no demand from within the country for work to develop new biopesticides. As this situation appears unlikely to change in the near future, it is not recommended that CABI consider expanding its efforts to develop new biopesticides in Pakistan at this time.

4. CABI Theme: Trade and Commodities

CABI has worked a lot with specific commodities in the past. The Cotton mealy bug project referred to elsewhere is just one example. There appears to be a particular need – and government interest – to develop better agricultural practices for export crops, focussing on meeting the SPS standards of importing countries. This is particularly important for potato and fruits such as mango and citrus. The extent to

which such work is best structured within CABI under a theme entitled “Commodities” rather than within other themes such as IPC/ICM, K4D or other is questionable.

A position for an expert in commodities is currently vacant due to the opportunity being given to CABI staff member (Ghulam Ali) to complete his Ph.D. from Netherlands. The Director himself is supervising the current work under this theme until the staff member returns in May 2015.

4.1 Sanitary and Phytosanitary (SPS) Measures

At the last regional consultation Pakistan stressed the importance of strengthening SPS and quarantine services. While many aspects of agricultural support have been devolved to the Provinces, SPS and quarantine remain primarily a Federal concern. CABI is helping to strengthen the Pakistan SPS system, especially through training personnel in the DPP (through both formal and on-line courses) and has signed a MOU with CABI on risk assessment and SPS. While this work mainly involved the transfer of knowledge, much of CABI’s research on IPM systems – including biological control and the use of biopesticides - has important implications for SPS measures.

CABI could also make a useful contribution through studying the effectiveness of different SPS systems. Given CABI’s expertise in this area, the development of a focussed strategic research initiative aimed at providing information to increase the efficiency and effectiveness of SPS systems in the region and globally would seem worthwhile.

4.2 Food Safety

Mycotoxins (especially aflatoxin) and pesticide residues are both major problems in Pakistan and can seriously affect exports. A new bill is before Parliament establishing a national food safety authority and setting out permissible residue levels. The Government is seeking CABI’s help to establish – and possibly run – a residue testing laboratory to ISO 17205 standards. According to one official interviewed, the Government may also seek CABI’s help in establishing a laboratory for testing the composition and quality of pesticides being sold in Pakistan.

One possibility raised, that would seem worthwhile pursuing through a feasibility study, would be for the testing laboratories to be set up so as to provide services not only within Pakistan but also to other countries in the region.

A potential new project is under consideration by Nestlé to look at the problem of aflatoxins in dairy products that result from feeding animals with contaminated cotton seed cake. The project, a joint initiative involving both CABI-Egham and CABI-CWA, aims to make a better quantitative assessment of the problem, identify critical control points and look at the possibility of developing biological control systems for *Aspergillus*. This project, if funded, is a ground-breaking initiative that could open up an important new area of research and development for CABI. As such it is of considerable interest.

The assistance being provided by CABI in setting up laboratories Afghanistan is mentioned elsewhere in this report.

4.3 Post Harvest Losses

It is estimated that, in common with most countries of the world, 30–40% of the food produced in Pakistan is lost post harvest, due in large measure to spoilage by insects and microorganisms. CWA has done very little in this area to date but given CABI’s

experience and expertise in pests and diseases, it would appear to represent a potentially important opportunity for CABI to make a very valuable R&D contribution.

5. CABI Theme: Knowledge for Development

CABI has devoted very considerable time and effort to this theme, especially through its activities with Farm Field Schools and more recently Plantwise (see below) and the use of ICT.

A DFID funded project entitled “E-Zaraat” explored the use of ICT in extension in a pilot district of Punjab. It comprised 4 components: a farmers’ helpline, a text messaging service, a voice message advice service and an information web-portal for agricultural extension staff. The project was regarded as a success and the Government of Punjab would like to see it rolled out across the Province. If this goes ahead, CABI should give attention to the possibility of gleaning information arising from the electronic service itself (e.g. regarding queries on specific pests and user profiles) and managing it in such a way that it becomes a useful research resource in its own right. Such a resource might, for example, prove valuable for monitoring pest and disease incidence and severity, predicting the probability of future outbreaks, etc.

5.1 Integrated Crop Management

As section 3.2 above makes some observations relating to IPM and ICM, nothing more will be said here.

5.2 Plantwise

The CWA Office covers Plantwise activities in Pakistan, Afghanistan and Sri Lanka – the latter a carry-over from the period when the Pakistan Office also covered S. Asia. In addition to Dr Ashraf Poswal, CABI’s Global Director for Plant Health Systems Development, Coordinators for all three countries are based in the CWA Office. The Plantwise team is responsible for quality control and validates data before it goes into the Knowledge Bank. While Plantwise itself does not support research, there was a wide recognition that the Knowledge Bank is a potentially powerful source of information regarding pests and diseases, and that analysis of the database could yield invaluable information regarding pest and disease incidence, severity and spread. The Department of Plant Protection (DPP) of the MFSR does not yet have access to Plantwise data, but training in data handling and interpretation are planned for later this year. The use of Plantwise Knowledge Bank as a basic resource for research is also covered in other Centre Science Review reports.

5.3 Seed Systems

The Government has just passed a new seed act regulating such issues as seed quality and the use of hybrid and GM varieties. A separate Bill recognizing Plant Breeders Rights is also now before Parliament. This is an area where CABI could make a useful contribution - especially in the area of seed health. There is likely to be a need for additional research in this area as well as providing appropriate evidence-based information to farmers and seed producers.

6. CABI Theme: Bioservices

6.1 Diagnostics

CWA undertakes work in the diagnosis of fungal, bacterial, viral and nematode diseases of crops, as well as the identification of insects. Current research includes studies on the identification and genetic diversity of mealy bugs as well as work on baculoviruses.

The Insect identification work is aided by CABI-CWA's collection of some 6,000 specimens of plant pests, predators and parasitoids. While this collection is available for consultation *in situ*, its value as a resource would be considerably enhanced if it were to be digitized. I fully support CABI-CWA's stated intentions to seek the resources required to enable such digitization to take place.

The diagnostics laboratory currently has basic equipment for identification based on PCR and blotting techniques as well as facilities for microscopic examination. If electron microscopy is needed there are institutions in Pakistan where the work can be carried out. For further discussion the laboratory needs – specifically with respect to virus identification - see below.

6.2 Afghanistan

CABI-CWA has also been very active in recent years in establishing a biological control laboratory in Kabul, as well as an identification facility for fungi, bacteria and nematodes. The Centre has also designed a laboratory complex for the Ministry of Agriculture in Kabul under the World Bank Funded, Afghanistan Agriculture Input Project (AAIP). It includes laboratories for fertilizer analysis, pesticide analysis, residue testing and food toxicology. Project design and development is also underway in Afghanistan on the following:

1. Reviewing and re-structuring Border Quarantine Stations in 9 provinces of Afghanistan in 2015
2. Conducting a nation-wide insect pest and disease survey from 2015-2018
3. Designing an agriculture input delivery system for Afghanistan from 2015-2018

7. General Issues

7.1 Science and Science Quality

All Pakistani government officials interviewed expressed their strong appreciation for both the quality and relevance of CABI's work and appreciated its very good relationships with various institutions within the country. Several indicated that the Regional Consultations were a particularly useful way of ensuring that CABI addresses priority issues. One Government interviewee said that because CABI is so highly respected for its ability to produce results, there is a danger of expectations becoming higher than CABI can deliver!

The number of CWA projects that have a significant research component are relatively few, with most addressing issues of Knowledge for Development and Commodities and Trade. However, there would appear to be significant opportunities to increase research output within many of those projects that are nominally concerned only with the application and dissemination of knowledge. Many donors are averse to supporting research, tending to see it as a luxury rather than, as is so often the case, a critical requirement for project success. However, with a little imagination and forethought, such projects can often be designed in such a way as to generate important new knowledge. All that may be needed is look at project development through a research lens – driven by a desire to create relevant knowledge. Several of the PhD level staff members interviewed expressed an interest to continue their scientific careers and see publishing as an important way forward. Others seem less concerned about this and regard their primary function as ensuring the transfer of science-based knowledge to farmers, extension workers and others in the agricultural service industries.

According to an analysis of papers published by CABI scientists based in CWA, only two papers were published in 2012 (of which one was in a journal rated IF2 or less

and the other was in an unrated journal) and in 2013 there were a total of six publications of which three were in journals rated IF2 or less and three were in unrated journals. In 2014, the total publications rose to seven papers published in refereed journals (with a further two in press) as well as an additional five scientific and technical reports. However, while 2014 appears to be a significant improvement over recent years, it should be noted that this is the total publications output from a staff of which 41 have MSc level degrees or higher. I was informed that the publications record used to be better in the past, especially on biological control.

The CABI-CWA library is relatively rudimentary and although staff members have access to the library of the Arid Agriculture University, that too is apparently not well stocked. CABI-UK provides some assistance in accessing scientific literature and overall the staff interviewed did not regard this as a major limitation in their work. There appears to be a lack of demand by staff for greater access to scientific literature and this may reflect a low level interest in publishing in scientific journals *per se*, and/or the lack of access to literature might itself be a deterrent to scientists publishing in refereed journals.

While accepting that most projects emphasize development rather than research – and that this is key to CABI's mission and receives the lion's share of donor funding - nevertheless it is important for a science-based institution to maintain a solid scientific track record. Without this, CABI is likely to be much less competitive in its search for funding, even for development activities.

If a greater emphasis on scientific research and publication is to be promoted, it may be necessary to look at providing additional incentives, which could include, for example:

- Giving time spent on research and the publishing in peer reviewed journals more weight in performance appraisal and reward systems, including promotion;
- Providing more support for publishing in open access journals;
- Instituting a system of mentoring by scientists located in the European Centres or elsewhere;
- Encouraging more internal and external research partnerships, particularly at the thematic level;
- Providing greater backstopping in biometrics and paper writing
- Improving access to scientific literature (a widely held concern across CABI);
- Promoting staff exchanges (short or long-term) between Centres
- Instituting a CWA science seminar series, or ideally a CABI-wide series using video-conferencing.

7.2 Comparative advantage and future research areas

CABI CWA has well recognized strengths in areas such as IPM, biological control, alien invasive species, pest and disease identification, SPS, quarantine, mycotoxins, food safety, extension and ICT. It is in a good position to provide leadership in these areas in Pakistan and across the region.

In looking to its future in the region, CWA sees opportunities in a number of areas including further expanding from IPM to ICM, supporting seed systems, reducing post-harvest food waste, developing value chains and promoting international trade. While it would seem highly appropriate for CWA to consolidate and to develop its programme further in those aspects where it has existing expertise, it is less clear how far CABI should venture beyond this. For example, the move from IPM to ICM implies integrating into the work such topics as soil fertility management, water management, mechanization and agronomy. CABI will need to decide whether or not

to make such a move, and if so the extent to which it will need to strengthen its own staff capacity in these 'new' areas or work through research partnerships to gain access to the expertise required. A similar decision would have to be made in any expansion beyond seed health into broader aspects of seed systems (e.g. PBR or variety registration) or in expanding beyond SPS and quarantine to embrace other barriers to international trade. The decision whether or not to expand into these related areas and if so how, will clearly depend to a very large extent on national government and donor interests, and the availability of appropriate expertise elsewhere in CABI and/or on partnering opportunities.

7.3 Staffing

CWA has a total staff of about 70, which includes 4 with PhD degrees (2 entomologists – including the Regional Director - an agricultural economist and a biotechnologist) and 37 with MSc degrees. The quality and enthusiasm of all the staff I met was very high and the Regional Director appears to be doing an excellent job in recruiting, retaining and motivating his staff.

Most of the core disciplines required are reasonably well covered but an analysis of staff strengths in 2013 indicated weaknesses in areas of food and nutrition, the safe use of agrochemicals, environmental hazard analysis and climate change, monitoring and evaluation, and impact assessment. To this might be added the need to strengthen biometrics, socio-economics and ecology. Furthermore, if CWA is to expand into related areas (see last section) additional expertise might be needed in such areas as IPR and seed policy, soil fertility management, water management, international trade and GIS. In all case where additional staff capacity is needed, CABI should consider whether to seek recruit additional scientists onto its staff or to seek other ways to cover specific topics e.g. through strengthening partnership arrangements.

CWA currently has two PhD students working in Rawalpindi. Having higher degree students conduct their thesis research at CWA is an excellent way to both strengthen research capacity as well as develop human resources. CWA should increase its efforts to expand the number of research students it supports – which will probably require developing new relationships with universities in Pakistan and elsewhere.

7.4 One CABI

Several staff members interviewed indicated that they feel the move towards 'One CABI' seems to be working well and has already helped strengthen relationships within the organization. CABI scientists based in UK and Delémont provide good support, especially in relation to Plantwise. However, there is still room for improvement and several scientists indicated that they would welcome a greater level of interaction with their peers in other parts of the organization. Several said that they had never met their scientific counterparts working in other CABI Centres. Mechanisms for encouraging greater professional interactions across CABI should be considered, for example organizing face-to-face, or even virtual meetings of all scientists working in a particular topic of theme, and promoting greater collaboration especially at the project development stage.

The current organogram of the CWA office, shown in Annex 3, bears little resemblance to the overall thematic structure of CABI as a whole. It is thus hard to relate what CABI does in the region to the global organization of CABI's programme. I thus strongly endorse the Regional Director's plans to bring the organogram more in line with CABI's overall structure with focused thematic areas on Bioservices, Trade and Commodities, Knowledge for Development, Knowledge Management & ICT and Invasive Species Management.

7.5 CABI's Infrastructure

While the biological control laboratories are rather rudimentary, the scientists consulted indicated that by and large the facilities are fit for purpose. They are also currently being strengthened as a result of the purchase of some new equipment through a USDA-funded project. This will include a high-power optical microscope with camera attachment, dissecting binocular microscopes and insect rearing cages. If more funding were to become available, controlled environment chambers would clearly be useful, e.g. to break diapause in insects. It will hopefully not be too difficult to generate the resources needed for such additional equipment through specific donor-funded projects. Two provincial level laboratories have also been recently upgraded in Sindh and Baluchistan.

One scientist expressed the need for CABI-CWA to develop a virus identification capability, and ideally one that could also provide a regional virus testing service. Such a regional facility could make sense given the relative ease with which CABI is able to move plant and other materials into and out of Pakistan. Establishing such a lab would involve, *inter alia*, the acquisition of specialized equipment such as ultra refrigerators and strengthening capacity to carry out qPCR and other diagnostic techniques such as advanced ELISA assays. It could be developed either as a sole or joint venture with another advanced research institution in the region, and would, it is estimated, cost upward of £150,000. However, before considering any such investment, CABI would clearly need to undertake a detailed cost-benefit analysis, particularly identifying possible sources of investment, and taking into account projected operating costs and potential revenues.

7.9 Expansion into the CWA Region

There are a number of opportunities for CABI to strengthen its operations in the Central and West Asia region, based on the experience it has built up over the years in Pakistan. The Government of Pakistan is itself also looking to strengthen its relationships and expand its leadership role, particularly within Central Asia, and it sees CABI as a potentially important partner in this effort.

Afghanistan: CABI is already working effectively in Afghanistan and this has been detailed in Section 6.2. Most of the work in Afghanistan to date has been in the area of Knowledge for Development; more than 46 Plant Clinics have been established with World Bank and Aga Khan Foundation support and more are being added.

As the work on infrastructure and agricultural services develops, so specific opportunities for important scientific research are likely to arise (see section 7.1). Building research opportunities overtly or otherwise, into development projects would seem to be one positive way forward. The country-wide survey of pests and diseases in Afghanistan will hopefully provide much needed information regarding the most important pests and diseases in the country and thus help set priorities for research and development, and for seeking donor support.

Central Asia: It would appear that opportunities for Plantwise to expand in other Central Asian countries are somewhat limited at this time. However, significant possibilities would appear to exist e.g. in Uzbekistan, Tajikistan and Kyrgyzstan in areas such as IPM/biocontrol and seed systems. Many of the important pests and diseases of crops of Central Asia are also present in Pakistan, and CABI already has considerable expertise on many of these (especially in relation to pests of fruits and vegetables). The region also offers opportunities for CABI to expand its work to new pests, for example the Russian wheat aphid (*Diuraphis noxia*), Sunn pest

(*Eurygaster integriceps*) and Hessian fly (*Mayetiola destructor*) are all very important pests of wheat in C. Asia.

In looking to move more strongly into this region, it could be well worth establishing a partnership with the Regional Program for Sustainable Agriculture in Central Asia and the Caucasus (currently involving AVRDC, Bioversity, CIMMYT, CIP, ICARDA, ICBA, ICRISAT, IFPRI, ILRI, IWMI and Michigan State University) that is run out of the CGIAR Office for Central Asia in Tashkent, Uzbekistan (see www.cac-program.org)

Gulf Cooperation Council (GCC) countries: Although agriculture is a low priority for most of the GCC countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates), there are nevertheless significant opportunities for CABI to work in certain countries such as Oman that have a greater interest in agriculture and in international collaboration. While Saudi Arabia is keen to further develop its agricultural potential, for a whole variety of reasons, it is among the more difficult countries with which to partner.

A particular opportunity would seem to be in developing IPM systems for date production; the date palm being affected by a wide variety of pests in the Gulf including dubas bug (*Ommatissus lybicus*), red palm weevil (*Rhynchophorus ferrugineus*) and lesser date moth (*Batrachedra amydraula*). Greenhouse and vegetable production are also areas where CABI's expertise in IPM could prove invaluable.

A key partner for work in this region could be the sister AIRCA member, the International Centre for Biosaline Agriculture (ICBA, Dubai United Arab Emirates. See <http://www.biosaline.org>),

West Asia: Opportunities for work in other West Asian countries appear to be more limited at this time in view of the prevailing security and political situation. However, it might be worth looking for opportunities in Jordan – particularly in IPM in vegetable and fruit production. Collaboration with the International Centre for Agricultural Research in the Dry Areas (ICARDA) could prove valuable in this part of the region.

North Africa: The large cultural and economic ties between the North African countries (from Egypt to Morocco) coupled with the many environmental and agricultural similarities, might argue for CABI to include this region within the purview of the CWA office rather than as part of its African operations =/where it receives scant attention at present.

8. Conclusions

While the CWA programme in Knowledge for Development, and in particular the work on Farm Field Schools, ICT and Plantwise, were singled out for special praise by most of the individuals interviewed, the scientific programme of CABI was also very well appreciated. Dr Iftikhar Ahmed, Chairman, Pakistan Agricultural Research Council (PARC), for example, particularly praised CABI's work on integrated pest management of cotton as well as the work on fruit flies, and more recently Apple Codling Moth.

Dr Mubarak Ahmed, Director General of the Department of Plant Protection also stressed the fact that unlike many technical assistance agencies, CABI provides a 'permanent' presence in Pakistan. It has thus been able to build up important long-term relationships and is particularly valued as a source of unbiased, scientifically sound information. It is also valued as a conduit to foreign expertise, research

equipment and other resources, especially as foreign exchange controls and other restrictions make it difficult for Pakistani Government organizations to access them directly.

Dr Shahid Masood, Head of Crop Science in the Pakistan Agricultural Research Council and CABI's Liaison Officer with the government of Pakistan, indicated that CABI is well on track with respect to addressing the country's priorities.

While CABI has clearly made an impressive impact in Pakistan, the work has tended to be somewhat piecemeal: relying to a large extent on a wide variety of relatively short, mainly 2-3 year projects. While recognizing the difficulties, success in achieving longer-term Pakistani Government and/or donor commitments would enable a more sustained effort to be brought to bear on key priority issues. It is well worth devoting considerable effort to try to achieve this.

While CWA has a number of excellent scientists, including its Director, it remains weak in several key areas. Furthermore, given CABI's major focus on development, in the region, achieving scientific excellence, as exemplified through publications in peer-reviewed journals, is not generally the highest priority of most staff met. However, CABI's reputation – and hence its ability to raise resources - depends to a considerable extent not only on its track record in international development but also on its scientific credibility.

To achieve this, it is recommended that a series of measures be adopted that are designed to promote a stronger research culture within CWA. While several suggestions in this respect are contained within the report, many cannot be addressed by the CWA Director alone and will require attention and support from HQ.

So, in conclusion, CABI CWA has made some very impressive progress over recent years and with a little extra support and attention to a few key areas, it is well poised to make a strong scientific impact in the future, not only in Pakistan but also within the wider region it seeks to serve.

Annex 1. Overall Terms of Reference for the External Review of CABI's Science

Retrospective:

has CABI's science programme since the last review (2009) been fit for purpose?
Have we delivered to stakeholder requirements and CABI strategic plans? Aspects to consider might include:

- Response to and implementation of recommendations from the prior review
- Publications and their impact
- Quality of science/resources/people in key areas
- Scientific aspects of project design, delivery and outputs
- Monitoring and evaluation of project outcomes and delivery
- Project relevance/responsiveness to member country priorities
- Project impacts
- Partnership management and development (how do our national and international partners feel about working with CABI).

The Future:

- what should the focus areas be, building on current areas of actual (or perceived) strength?
- Based on the identified key areas to build on for the future, how do we optimise our science programme towards achieving CABI's mission and goals?
- Should we continue to focus our research efforts in E-UK and E-CH or should we broaden / replace them with activities in selected / all developing country Regional Centres?
- What additional technologies, facilities and skillsets should we consider in order to pursue the recommended focus areas?
- Who would be good strategic partners with whom we could pursue the recommended areas?
- How should we monitor and evaluate our science going forwards?

Specific issues to be considered in the Review of CABI's Science programme for Central and West Asia , Pakistan

- What are the opportunities for growth within the region but outside Pakistan eg. recent discussions with UAE?
- Are there more opportunities for science based projects, eg, Aflatoxins in milk proposal; do we need science base/lab investment?
- An assessment of the current scientific skills base and the scientific content of the work we do.
- Identify the opportunities/needs for molecular studies and identification tools to address the questions - Do we need to add molecular skills/technologies? If so, is this just in the UK or does it apply to other places as well/instead?

Annex 2

Schedule of meetings

17 March

- Dr Babar Bajwa, Regional Director, Central and West Asia, CABI
- Dr Iftikhar Ahmed, Chairman, Pakistan Agricultural Research Council (PARC)
- Dr Ashraf Poswal, Global Director, Plant Health Systems Development, Plantwise and Previous Regional Director 1995-2011
- Dr Riaz Mahmood, Project Manager, Insect Biocontrol Specialist, CABI

18 March

- Dr Muhammad Aslam, Food Security Commissioner, and Dr Syed Waseem-ul-Hassan, Deputy Food Security Commissioner, Ministry of National Food Security and Research
- Dr Aamir Malik, Bioservices, CABI
- Dr Mubarak Ahmed, DG, Department of Plant Protection, MNFSR and DG Southern-zone Agricultural Research Centre, MNFSR
- Dr Zahid Qureshi, Project Officer, IT User Support/Research, CABI
- Dr Shahid Masood, Member Plant Sciences, PARC and CABI Liaison Officer

19 March

- Dr Babar Bajwa, Regional Director, Central and West Asia
- Mr Zahid Qureshi, IT Support Officer, CABI
- Muhammad Afzal, Systems Engineer, CABI
- Dr Kauser Iqbal Khan, Agricultural Economist, CABI
- Dr Shakeel Ahmad, Coordinator, Knowledge for Development, CABI

Current Organogram

