

**CHEMRAWN XI**  
**Latin American Symposium on Environmental Chemistry**  
 Montevideo, Uruguay, 15-20 March 1998

***Information and Assessment***  
 prepared by Prof. Moyna, reviewed July 2001

**I. General : CHEMRAWN XI**

1. Title:

Regional Environment Chemistry Meeting (CONGRESO LATINOAMERICANO EN QUIMICA ANALITICA AMBIENTAL)
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2. Location, date and duration

Location	Date	Duration days
Montevideo, Uruguay	March 15-20, 1998	Six

3. Participation

Number of countries represented	Number of participants; Total (regional)	Number of lecturers; Total (regional)
21 (Regional-13, Non-regional-8)	261/135	26/2

1-3 (A) Satellite activities

Activity	Date	Location	Number of participants (total/local)	Number of lecturer (total/local)
IOCD Workshop	March 19-21	Montevideo, Uruguay	25/10	11
Accreditation Course for AL.	March 17-18	Montevideo, Uruguay	19/15	.
RAQAL meeting	March 19	Montevideo, Uruguay	31/8	.

4. Budget

Budget in US\$	Source of financing a) participants % b) IUPAC % c) Government % d) Industry, and NGO % e) grants in kind	Names of major sponsoring organisations
89 710	a) 13 250 b) 0	SIDA-SAREC, OPCW, Government, IMM, IOCD,

	c) 3 500 d) 26 760 e) 46 200	IAEAC, Swedish Institute
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## II. Conference potential

### 1. Scientific leadership

Name of Conference Chairman	Names of Conference Vice-Chairmen	Number of invited lecturers
Dr Folke Ingman	a) Al. Pohland b) Joseph Tandarellas c) Patrick Moyna	25

### 2. Conference papers

Number of plenary papers	Number and titles of the specialised sessions	Number of papers at each session (oral/poster)	Number of papers authors
27	a) Analytical aspects of urban and agrarian pollution b) Methodologies for effluent and emission control c) Treatment and final disposition of liquid effluents and solid residues d) Recommendation and restoration by chemical and related methods e) Prevention and non-contamination processes f) Related topics	a) 11/26 b) 1/4 c) 1/6 d) 1/4 e) 0/4 f) 2/4	Total 195

### 3. General statistics

Total presentations	Oral presentations	Posters presentation	Conference presentations	Number of authors	Authors/paper
95	20	48	27	195	2

### Typology of papers

Typology	Review papers	Economic/organisati on issues	Basic science	Technology/processes issues
Number	10	5	62	18

### 4. Conference strategic issue

*The role and potential of chemistry and in particular analytic chemistry in prevention, treatment and remedies in environment protection*

#### 4.1 Strategic goals of conference

- a) To identify the state of environment in Latin America
- b) To identify potential of local laboratories to ensure the local expertise, instrumentation and methodologies to carry out proper analysis of polluted samples
- c) To identify potential for monitoring of effluents
- d) To identify potential of international co-operation in development of the research program

#### 4.2 The conference key-words

- a) Monitoring
- b) Heavy metals
- c) Marine/coastal environment
- d) Pesticides
- e) Health
- f) Support networks
- g) Effluent treatment
- h) Remediation

#### 4.3 Identification the weight of key words in presented papers

Key word	Percent of papers related to the key word
a) Monitoring	a) 30%
b) Heavy metals	b) 20%
c) Marine/coastal environment	c) 8%
d) Pesticides	d) 8%
e) Health	e) 7%
f) Support networks	f) 5%
g) Effluents treatment	g) 5%
h) Remediation	h) 4%

### III. Conference impact

#### 1. Future Action Committee

Chairman - Folke Ingman

Members - M. Figueiredo Jardim, D. Klckow, A. Pohland, C. Rappe, L. Ryden, P. Moyna

Editor - M. Knochem

#### 2. Conference findings and recommendations and their addressee

##### 2.1 Conference findings

- a) *The state of the environment in Latin America is deteriorating.*

The Conference concluded that the environment in Latin American countries is seriously and rapidly deteriorating as heavy pollution of water courses, land degradation and soil and air contamination continues. Available data, among them many reported to the Conference, points to serious emissions of heavy metals, toxic organic compounds and untreated sewage from cities, industries and agriculture. These emissions constitutes not only a threat to individuals public health

and the living environment and its biodiversity, but also a considerable economic loss for the countries concerned, due to misuse of natural resources and investments.

*b) Urgent actions requires reliable information*

The situation calls for urgent action. Although many sources of pollution are obvious and should be addressed without delay, a more systematic approach needs to be implemented. Therefore, reliable data will be of fundamental importance. Such data will be necessary for all kinds of environmental actions, be them legal actions or economic sanctions such as taxation measures. Most importantly, they will beneeded to trace the sources of environmental impact, understand the consequences on ecosystem and constructively addressed the causes of pollution.

*c) Research laboratories are prepared to take responsibility for data collection.*

The Conference welcomes that the RAQAL ( Red de Analisis Quimico Ambiental en America Latin) network of chemical laboratories in Latin America is prepared to contribute to required effort. The RAQAL network, which is in existence since 1990 was meeting as a part of Conference. It has been secured international support to ensure that the required expertise instrumentation and methodological developments will be available to carry out proper analysis of environmental samples. The analytival chemistry community is willing to work on e.g. sampling strategies and methodology for quality control od analytical results. This first basic step ensures a sound platform for further action.

*d) Natural regions for monitoring exist*

Monitoring water needs to take into account the natural borders for waters, the drainage basins and catchments. To improve the situation of a water course all pollution sources within the drainage basin must be addressed. Upstream sources will heavily influence the downstream situation. Thus water monitoring should be organised around catchment areas and mechanism for the required co-operation in such areas should be found. Meteorological conditions define areas which influence each other heavily through air-borne pollution.

*e) Experience from the world*

The Swedish participants at the Conference contributed with experiences from a long term international co-operation program for the protection of the environment of the Baltic sea. This includes to the best of our knowledge the longest monitoring program in existence today. The monitoring of pelagic and benthic systems have been running in the Baltic Sea for more than 40 years. This started as, and continues to be a research program, although today governmental authorities are responsible for routine measurements. It has been of utmost importance for the present improvement of the Baltic marine environment. The program has served as a model when organising other monitoring programmes of regional sea basins. Such a program is now being carried out in the Gulf of Thailand. Other relevant experiences exists in several regions e.g for he Rhine river on the European continent and the great lakes district in North America.

## 2.2 Conference recommendations

### 2.2.1 Addressees

(Scientists-1, Industry –2, Universities –3, Governments –4, Adhering organizations –5, International organizations –5.)

### 2.2.2. Recommendations

#### a) *Monitoring programs are urgently called for (1,3, 4, 5, 6)*

The scientists at the Conference concluded that it is urgent that laboratories in the region address the question of a large scale monitoring program to survey the environment. This will provide a base both for

environmental research and for environmental protection measures. The design and execution of emerging monitoring programs needs relevant competence both regarding environmental science, and chemical and biological analysis. Just as in other parts of the world, adequate scientific institutions, not the least universities, would be the natural platform for the development of such a program, and scientists at the participating institutions in Latin American countries are prepared to contribute.

#### b) *Regional cooperation is essential (1,2, 3, 4, 5, 6)*

Pollutants do not recognize national borders, and a successful environmental program is forced to adapt to this fact. A monitoring program should thus be international. The participating scientists are prepared to seek regional cooperation. In the longer term, the governments in the region, in agreement with the results of the UN Conference of Rio de Janeiro, 1992, and the Agenda 21 document, should take responsibility both for environmental surveillance and proper action, in order to preserve its natural heritage and its long term capacity for sustainable development through environmental protection.

#### c) *Quality and inter-disciplinarity are essential (1, 2, 3, 4)*

Environmental data will serve no purpose if they are not related to their effect on the environment and on humans. A successful monitoring program will have to rely on cooperation between many fields of science, such as chemistry, biology, ecology, medicine, geography and hydrology, amongst others.

The arrangements for interdisciplinary cooperation should be addressed in a appropriate way and solved.

#### d) *A strategy is needed for optimal results ( 3, 4, 5)*

A monitoring program should, in the first place, develop a proper sampling strategy to ensure that analytical efforts give meaningful and interpretable data.

\* The chemicals to be measured should include not only toxic substances, such as heavy metals and organic pollutants, but also other substances present in amounts that are deleterious to the environment. It is particularly important to include nitrogen and phosphorus, as they cause the ongoing eutrophication from poorly treated or untreated sewage from urban areas, or as run-off from agricultural land and associated industries. This is particularly urgent in countries where agriculture is a mainstay of the economy.

\* Environmental impact is due to pollution of air, water, soil and food.

All these sources need to be monitored. Samples should be taken not only in open air or water but also from biological samples. Adequate data on pollution of water needs analysis of benthic long-lived organisms and the fish fauna. This makes it possible to identify substances hazardous to humans via food, in particular, sea food and fish. Databases for toxic substances found in different matrices such as sediments, organisms and water, should be set up.

\* Biological monitoring will give essential information on the ecological effects of pollutants.

\* Environmental transport and fate of xenobiotic compounds in the specific environment in Latin America should be taken into consideration.

\* A search for specific toxicological endpoints in the flora and fauna as well as in the human population, including ethnic minorities with specific food habits, need to be addressed.

*e) Monitoring water quality ( 2, 3, 4, 5)*

The status of water in the region should be monitored most urgently. Clean water for everyone is a prerequisite for the health of the population. Most pollutants are emitted directly into water or finally end up in water as atmospheric precipitation. The environmental status of water can directly be used to design either treatment actions or to redesign the water management in urban areas, industry and agriculture.

*f) Monitoring air quality ( 2, 3, 4, 5)*

Measurement of air pollution is already ongoing in several industrial centers such as Cubatao at Sao Paulo in Brazil, as a result of a successful international cooperation project. Such measurements need to be prolonged in time and extended to include further areas. Increased car traffic in the big cities is a special concern for air quality and will in itself have serious effects on public health. Meteorological competence is essential for such a program.

*g) A change in the position of scientists in the Region ( 1, 3, 4, 5, 6)*

The number of problems is apparently overwhelming, but it should be clear that these problems can only be solved if the scientists from the region itself are involved as main actors. An important part of the decisions and of the activities have to be taken and generated within the Region, otherwise local groups will always be struggling to keep up with the latest proposals coming from abroad. This is why an important part of the future goals have to concentrate on the training of the scientists at present working in Latin America. More importantly, stress has to be placed in the education of a generation of chemists capable of working independently, of developing and validating the needed analytical techniques, of establishing and running their regional networks, and capable of raising the needed financial support from local and international groups and institutions.

### 2.2.3 Modality of implementation and dissemination

a) IUPAC has been requested to support distribution of the Final Statement and FAC recommendations

b) Modalities of transfer to the public

(1) Conference proceedings	Yes
(2) Publication in Chemistry International	Yes
(3) Publication in leading scientific journals	Selected papers
(4) Direct mail to NGO	Selected NGOs
(5) Direct mail to Industrial Associations	Industrial Federations
(6) Direct mail to Governments	Uruguay, Argentina, Brazil
(7) Publication in newspapers	Local press during Conference

#### 2.2.4 Recommendations for Future Actions (Addresses numbered as above)

##### *a) DAC-DCE Website. IUPAC (6)*

The Meeting proposes that IUPAC, through the collaboration of its Divisions of Analytical Chemistry (DAC) and of Chemistry and the Environment (DCE), set up a Website specifically designed to foster communication between environmental scientists.

##### *b) Training programs IUPAC (5, 6)*

It is suggested that IUPAC support existing and new training programs in the field of analytical and environmental chemistry. Both traditional academic training and postgraduate programs, or new proposals that might be suggested by members through the National Organizations should be considered. This information should be available in the proposed Website.

At the same time IUPAC should explore the possibilities of carrying out the above without duplicating efforts already under way, but rather focusing and supporting existing programs and approaches. These include RAQAL and its proficiency networking, which operate with the support of IAEAC (International Association of Environmental Analytical Chemistry), the regional IOCD-sponsored training Workshops, and other existing systems.

It is important that IUPAC sponsor activities which further the adequate accreditation of laboratories in the Region, laboratories which can then act as references for international environmental projects or for inter-regional commercial trade needs.

There are good possibilities of IUPAC working in a partnership with OAS (Organization of American States) on Chemical Metrology, and IUPAC should take advantage of activities, as those already established through CENAM (Mexico) and presently being carried out in this crucial field.

##### *c) Spin-off Meetings (1, 5, IUPAC)*

It is suggested that a series of CHEMRAWN XI spin-off Meetings should be considered for the Region. These future Meetings should center on regions in Latin America that have a natural coherence, such as the Rio de la Plata Basin (RP), Mexico, Central America and the Caribbean (MCAC), the Amazonian and Orinoco Basins (AO), and the Andean Region (AR). From the experience of the national organizing group of CHEMRAWN XI, it is not advisable to organize the activities in a country where IUPAC does not have an adequate linkage. These activities could be suggested to the National Organizations of Argentina (AQA, for CRXI-RP), Puerto Rico (CQPR for CRXI-MCAC), Brazil (ABQ, for CRXI-AO) and Chile (AQCh (or Peru) for CRXI-AR).

These spin-off Meetings should, while keeping their emphasis on the chemical aspects of Environmental studies, be multidisciplinary in their approach. In this way the viewpoint of chemists working on environmental problems would be improved, and other non-chemical experts in the field would improve their perception of the chemical topics involved.

It would also be interesting if they could focus on the more specific problems of each Sub-region involved, but also cover a more defined range of environmental topics, as a way of improving their international technical impact. The impact would also be enhanced if their Abstract Books had an International English Version. This is particularly important in this Global problem, where maximum diffusion is valuable.

*d) UNCG adhering IUPAC as an observer(1, 5, 6, IUPAC)*

As CHEMRAWN XI was instrumental in the organization of a Uruguayan National Chemical Group (The PEDECIBA-Química section of the “National Science Academy”) that is now in the process of requesting IUPAC Observer Country status, these Spin-off Meetings should be used to further extend the coverage of IUPAC in Latin America (now restricted to four members and one OC).

*e) A monitoring program for the Rio de la Plata drainage basin, la Cuenca del Plata. (1, 3, 4)*

The conference proposes the start of a monitoring cooperation program for the Rio de la Plata drainage basin. This basin is huge, it includes some of the most valuable biotopes of the world, such as the huge wetlands in Southern Brazil, and also some extremely polluted areas, i.e. in Sao Paulo and Buenos Aires. It is threatened by extensive agriculture, industrial activities and large cities with poor sewage treatment. It stretches roughly over a 3000 x 1500 Km area and over five countries now linked in the MERCOSUR, and includes a very large part of the Latin American population. A monitoring program would be a key component in improving and preserving ecological health, quality of life for the population, and preserve its huge biological diversity for future generations in this area. Scientists in the Rio de la Plata basin made contacts to establish a first Organization of future cooperation. CHEMRAWN XI asks for wide support for this initiative, in particular from IUPAC.

The future Spin-off Meetings could act as nucleus for similar efforts in the Amazonian and Orinoco Basins, the Caribbean and the Andean regions. Each has a particular ecology with a certain degree of natural ecological coherence, as well as peculiarities of logistics and politics.

*f) IUPAC methodological support to other Conferences*

As a growing number of IUPAC activities, such as CHEMRAWN XI, will be organized by Associations of the less developed countries, it would be of great use if IUPAC could prepare a “How to Organize Meetings” manual, based on its extensive experience on these activities (which can include the experience of Member Organizations). On the other hand, contacts with certain international organizations (UNESCO, OAS, FAO, WHO, etc.) and multinational companies (the chemical and pharmaceutical are obvious, but others such as McDonald’s, Coca Cola, etc., should also be considered) are simpler from the vantage point of IUPAC, that can officially contact Headquarters, than from a smaller national committee.

### 3. FAC further actions

Source of financing:	not established
Number of FAC members:	local (1)/foreign (6);
Number of meetings:	not established
Modality of action:	
Scientific follow up, record of implementations or recommendations by governments:	not recorded
Record of industrial implementation:	not registered
Results achieved:	scientific development initial collaboration of participants in joint projects



new members of RAQAL  
AOAC meeting in Montevideo 2001

4. Free assessment

4.1 General view

Conference covered the important area of the chemistry activities in the task of environment protection in region where exists possibilities to prevent further deterioration of the environment under condition of the organized monitoring of pollution and necessary actions of the local Government or their Regional organizations. The sophisticated analytical instrumentation gives the possibility not only to detect the pollution but also support the research of the impact on the human being of a such pollution.

4.2 Review of findings

It has been found that local laboratories supported by international experience exchange program are able to monitor pollution of soil, water and air under condition of the extensive co-operation between the Governments to control transborder pollutants exchange and include the meteorological services in combating results of unexpected atmospheric catastrophes.

4.3 Review of recommendations

Recommendations are concentrated around the monitoring systems: their establishment, regular financial support as well as action on the regional level. The importance of the matter requires highest quality of the research and laboratory discipline and organization. This must be reflected in the education of scientists and objective application of the scientific methodologies and instrumentation whatever its origin.

5. Cost assessment

5.1 Conference budget

Total costs involved were about US\$ 90 000, of which US\$ 43 510 were collected and administered directly by the organization committee (central budget), the rest being allocated directly by the sponsors to specific activities such as airfares and travel expenses for lecturers, computer and telephone services, bags, food and other ancillary expenses covering needs of participants, and, although requested by the organizing committee, were not administered by the local committee.

Total Expenses		90000
Travel & lodging	(52.5%)	47260
Secretarial & organization expenses	(9.5%)	8580
Lecture hall rent & translation services	(14.2%)	12800
Abstract book & other	(4.3%)	3900
Materials for participants & final dinner	(15.7)	14100
Passed to Gueica group	(3.4%)	3070

Cost per paper: (US\$350 total from which US\$170 of the central budget)

Cost per participant: (US\$900 total from which US\$400 of the central budget)

Cost of follow up: not established

These figures do not include direct expenses covered by part of participants (travel, lodging, etc.)

#### **IV. Conclusions and Recommendations from CHEMRAWN assessment**

##### 1.- Originating from review on the matter

The general findings and proposals of the FAC represent an excellent report on the present situation and a series of valuable proposals for action venues.

##### 2.- Originating from the organization experience for future conferences

###### *a) Regionality*

The original proposal for a “regional” CHEMRAWN meeting grew from the conviction that it would be easier to convene colleagues from a more restricted region than from a worldwide audience. This turned to be partially true. The presence of a vast majority of the participants from the region was clear.

There are advantages to organizing regional CHEMRAWNs as a way of spreading IUPAC activities worldwide, but their “regionality” tends to inhibit participation by top rated scientists other than the invited speakers. This resulted in this case a Meeting that was very illuminating for regional participants, but that lost the “World Forum” experience which is a goal for CHEMRAWN activities.

Scientists from LDC countries are probably less “regionally” oriented than their European or North American counterparts, as in many cases their basic contacts still are with their northern Alma Maters and contacts, and not with neighboring - country colleagues. In this sense “regional” meetings can be effective as a way of starting cross-border contacts and collaborative activities. Regional meetings should preferably be “CHEMRAWN sponsored”, rather than full CHEMRAWN, as a way of isolating the Committee for meetings where the results have a much more limited impact and might sometimes be awkward.

###### *b) Organization*

CHEMRAWN meetings should be preferably carried out where there exist IUPAC connected associations, which can give a reasonable organizational network to carry out the actions needed. Administration can be managed on the basis of a very active and devoted local group, as was the case in Montevideo, but this can be detrimental to their personal activities.

The need for advance planning and schedules of a CHEMRAWN meeting are imperative, and this has drawbacks in LDCs, where political, financial and social situations can change catastrophically. The existence of “alternative” sites can be considered but increases the organizational resources involved.

CR XI was organized in a small country with no direct IUPAC membership. This could mean that some of the above mentioned problems could be different or non-existent in a large, LDC country with a IUPAC member organization.

“Satellite” activities make it easier to collect a larger number of colleagues, but they have their own shortcomings, as the focus is more dispersed, and sometimes conflicting schedules lower the feeling of a common goal in the meeting.

It would be important if a “White Book” where the system of organizing IUPAC meetings were described, probably with the help of ACS, RSC and other member organizations with vast expertise on the subject.

*c) Costs*

Even a smaller regional meeting means large expenses and investments. International sponsors are not quite prepared to cover local costs, and it is sometimes difficult to contact the headquarters of international corporations from the national representatives. Regional meetings have to consider piecemeal financing of their activities, and this requires a very active and devoted local group. If it can be engaged, administrative costs can be kept to a minimum, and the use of electronic communications opens the possibility of speeding up the communications and giving any group instant connections with practically all the scientific and academic world. Unfortunately contacts for financing seem to fall outside the scope of the “usage” of these more modern methods and still require lots of personal contacts and meetings. This can be a problem for regional meetings, as it is possible to make contacts in one country for a meeting that will cover many.

*d) Diffusion*

The diffusion of the proposals and results can be fingered as the main soft spot of CR XI. The follow up of the proposals has not been made, and although cases of new collaborations are known, in most cases CHEMRAWN will not be considered their original starting place.