

“Capacity building with a new paradigm in environmental management: The Integrated Watershed and Coastal Area Management in Cienfuegos, Cuba”.

MSc. Ángel R. León Pérez, MSc. María E. Castellanos González y Dra. Clara E. Miranda Vera

Centro de Estudios Ambientales de Cienfuegos, División de Capacitación y Desarrollo Profesional. Calle 17 esq. 46 s/n. Rto. Reina, CP 55100, Cienfuegos, Cuba.

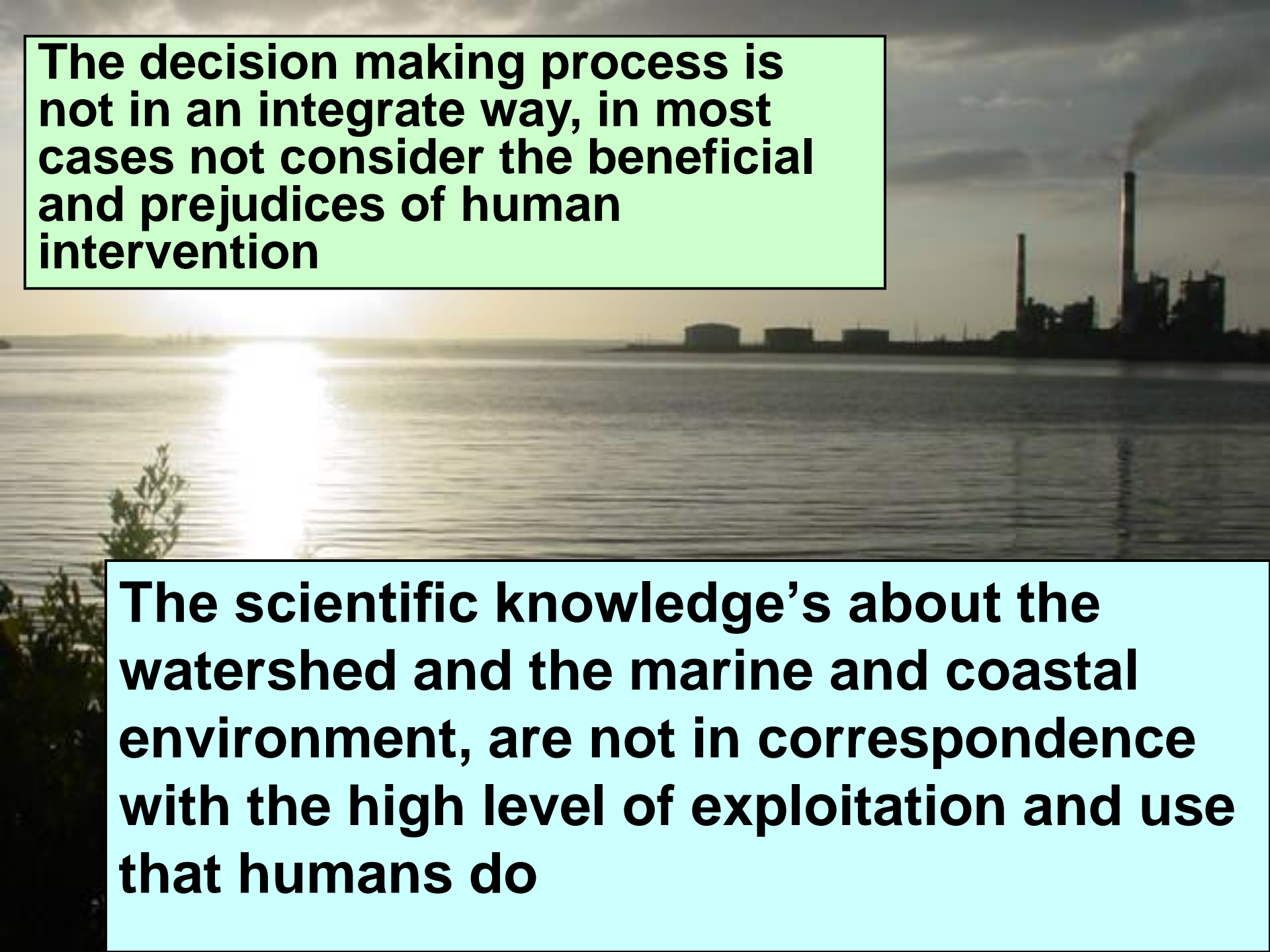
Teléfono: 042 511889

E mail: leonp@docencia.ceac.cu

The anthropic activities cause great affectation in watersheds and coastal areas threatening the ecosystems but at the same time the society, which is economic and welfare based in this areas.



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The decision making process is not in an integrate way, in most cases not consider the beneficial and prejudices of human intervention

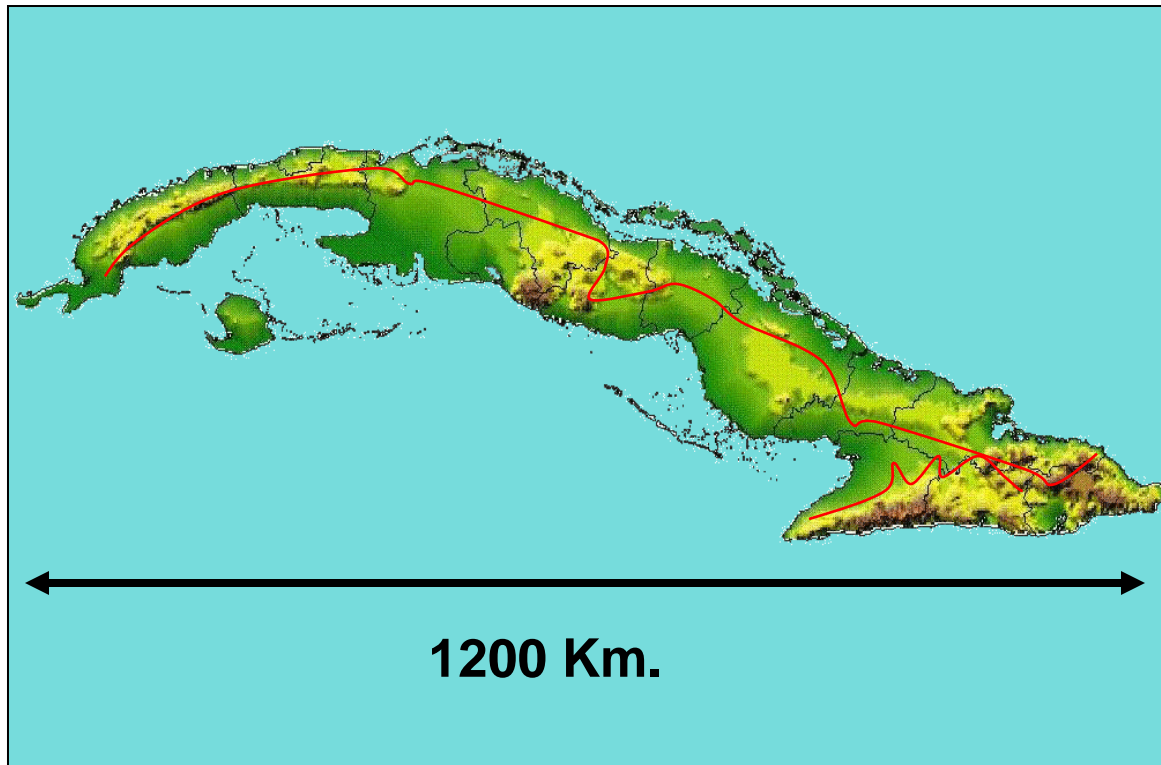
The scientific knowledge's about the watershed and the marine and coastal environment, are not in correspondence with the high level of exploitation and use that humans do

The introduction of Integrated Coastal Zone Management (ICZM) concept is today a necessity to contribute to the sustainable development of these areas in Cuba.

- However, to approach with success the environmental management that requires the real problem of this area, it is indispensable to know and to evaluate the existing complex dynamic interdependence, in qualitative as well as quantitative terms, between the coastal area and the basin.

Importance of the vision of IWCAM

- 1- The condition of insularity of Cuba and the lengthened form of the country with a division of the waters in a way that divides the island in two slopes, the south and the north

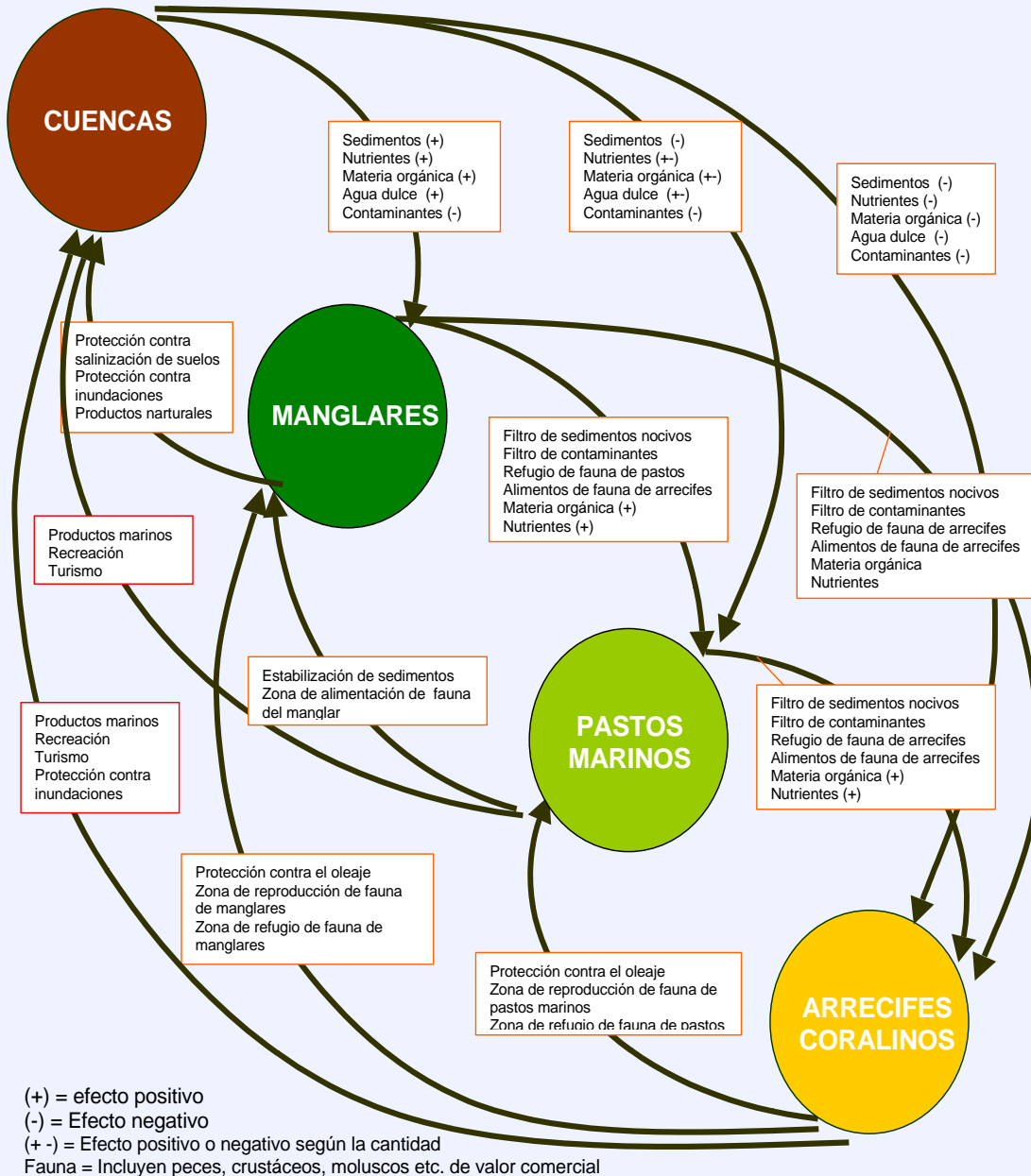


2- The problems, related with the drought on one hand and the increase of the affectations for floods due to hurricanes and extreme rainy events, makes the government to invest in the construction of reservoirs and hydraulic systems since the decade of 1960.

The hydraulic infrastructure is able to dispose 57% of the water resources existing in the country and store 9000 million m³ in 241 reservoirs administered by the INRH (National Institute for Hydraulic Resources)



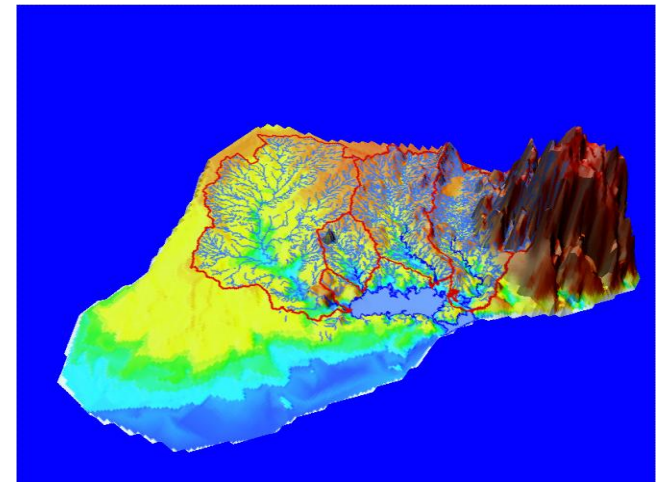
INTERACCIONES ENTRE ECOSISTEMAS MARINOS Y TERRESTRES



3- Three key coastal ecosystems in the Caribbean, mangrove, sea grass and coral reef, are considered well interrelated among them by the interchange of energy flux and different substances. They have also interchange with the hydrographical basins.

It had been proved that the main four basins with rivers that flow towards Cienfuegos Bay intervene directly in their environmental degradation due to the drag of sediments and pollution from several land based sources located in the area of the basins.

One of the main causes of these problems is the poor knowledge, by the population and interested ones implicates in the use of the resources and by the specialists and decision makers of institutions that pollute and impact directly with their activities freshwater and marine waters.

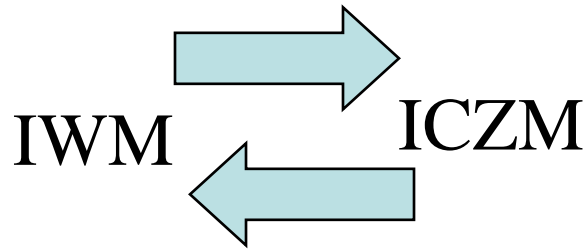
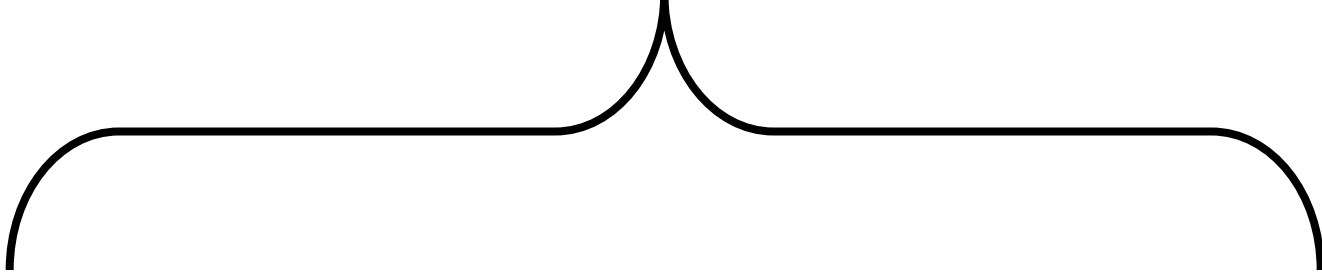


An environmental management plan of the bay without considering the integration of the watershed management would not solve completely the problems.

- The application of Integrated Coastal Zone Management (ICZM) is necessary for the sustainable development of these areas in Cuba; however, to approach with success the environmental management, it is indispensable to overflow the conceptual frame of the ICZM toward a new vision, the Integrated Watershed and Coastal Area Management (IWCAM).
- There is a great necessity of educate professionals with this approach, which is a demand of the current thoughts tendency about the environment.

For this reason the IWCAM has been inserted in a growing way inside the Program of Capacity Building in ICZM in Cienfuegos.

IWCAM



How the vision of IWCAM have been inserting into the Master in ICZM course.

- Using the basement of the project TIER II “Education for the Integrated Coastal Zone Management in Cuba”, the Academic Committee of the Master Program decided to include an elective course on hydrographical basins in the first version of the master course in ICZM (2002-2004).
- Also, inside the basic courses “Current Issues on ICZM” and “Components and processes of the Coastal Areas”, were included conferences about the importance of the basins for the coastal area and the implication for Cienfuegos bay.

How the vision of IWCAM have been inserting into the Master in ICZM course.

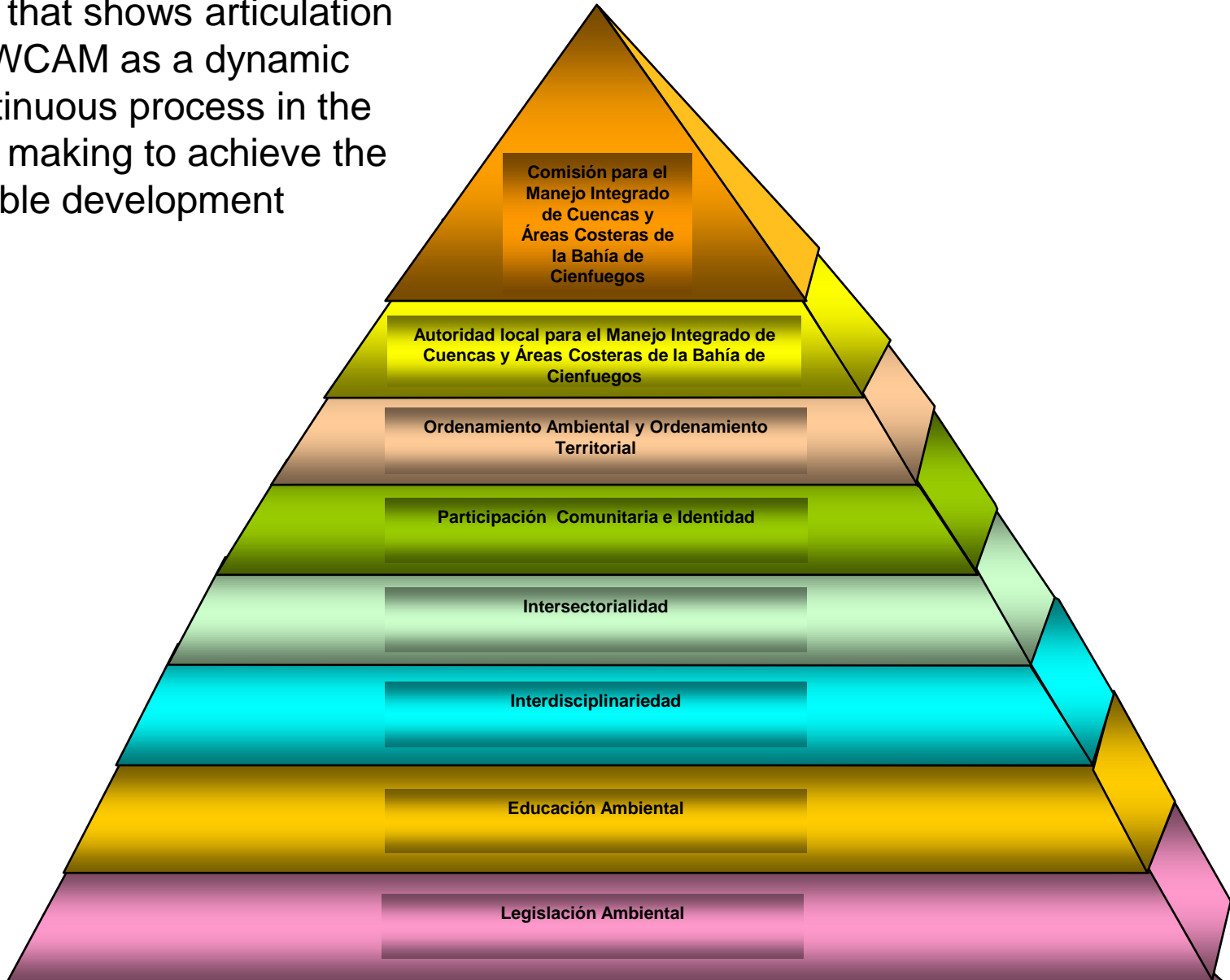
- ***The preparation of a project on the IWCAM for GEF-PNUD in 2004, by researchers of CEAC, and participation of professors from University of Cienfuegos in the Component 7- “Public education and awareness” of the Demonstrative project GEF – IWCAM “Application of concepts of integrate management in a demonstrative area of the province of Cienfuegos, Cuba”, was an incentive to guide thesis theme in this issues.***

1rst version of Master in ICZM (2002-2004)

- A thesis with the name “The taking of decision for the integrated management of Cienfuegos Bay and their tributary river basins” (Rey, 2004) was one of the most important theses of the first version of the Master Program because it help to introduce the concept of IWCAM to the government decision makers in 2004 and produced institutional changes in the province because the Provincial Popular Power Assembly approved the “IWCAM Committee of Cienfuegos Bay” in April 2004.

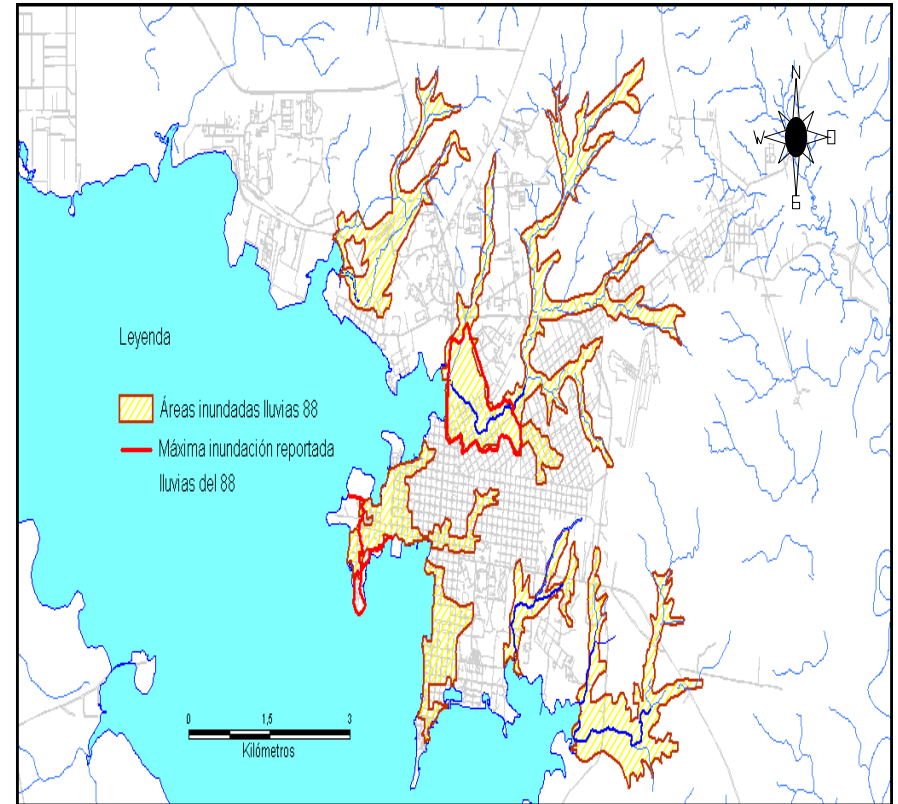
**PIRÁMIDE QUE MUESTRA LA ARTICULACIÓN
PARA EL MANEJO INTEGRADO DE CUENCAS Y
ÁREAS COSTERAS COMO UN PROCESO DINÁMICO Y
CONTINUO EN LA TOMA DE DECISIONES PARA
LOGRAR EL DESARROLLO SOSTENIBLE
(GOBERNABILIDAD)**

Pyramid that shows articulation
for the IWCAM as a dynamic
and continuous process in the
decision making to achieve the
sustainable development



1rst version of Master in ICZM (2002-2004)

- Other thesis with the name of “Use of GIS as a tool for the decision makers in the process of IWCAM in Cienfuegos” (Figueroa, 2007) have been used by the Civil Defence of Cienfuegos as base study to update the plans again risk of flooding by coast rise and severe rains.

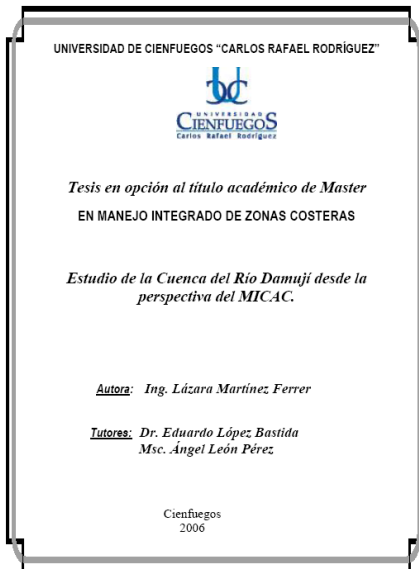
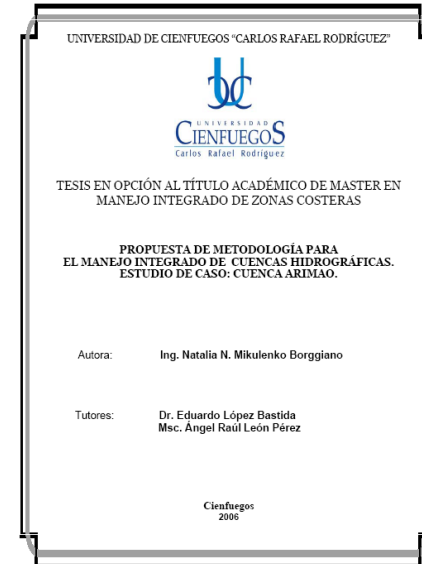


2nd version of Master in ICZM (2004-2006)

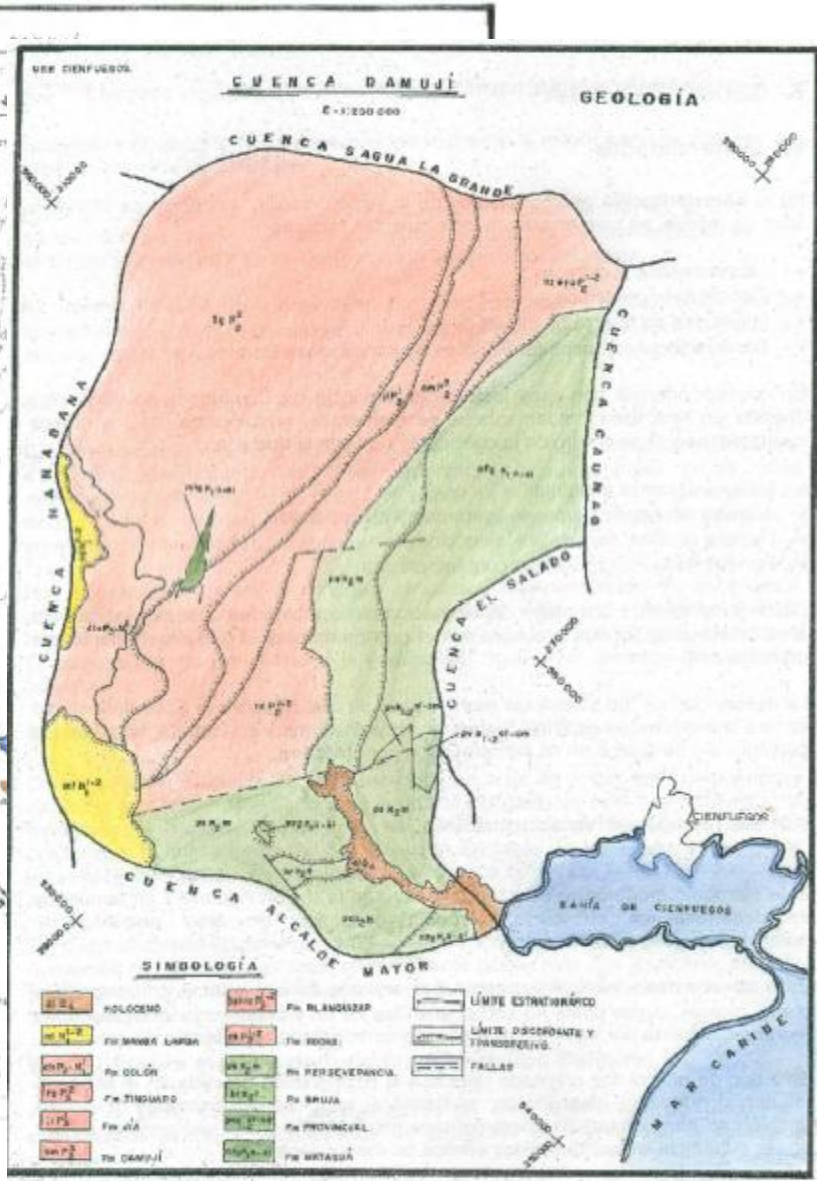
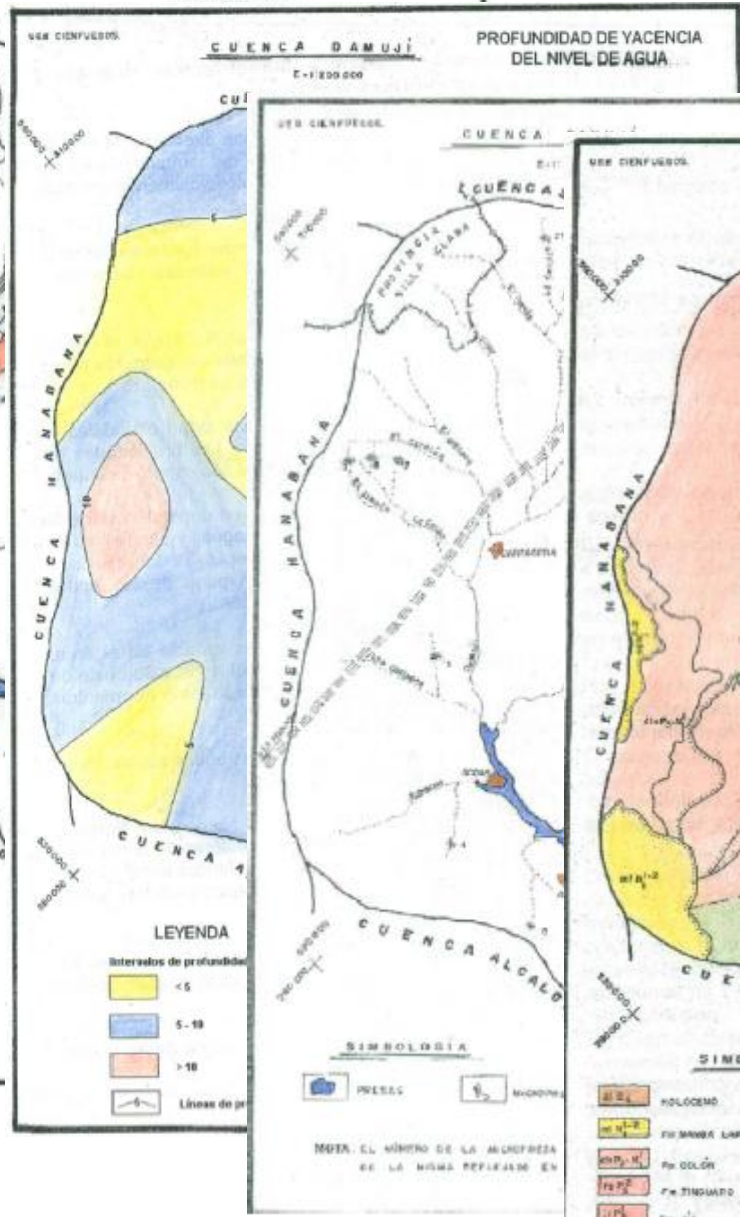
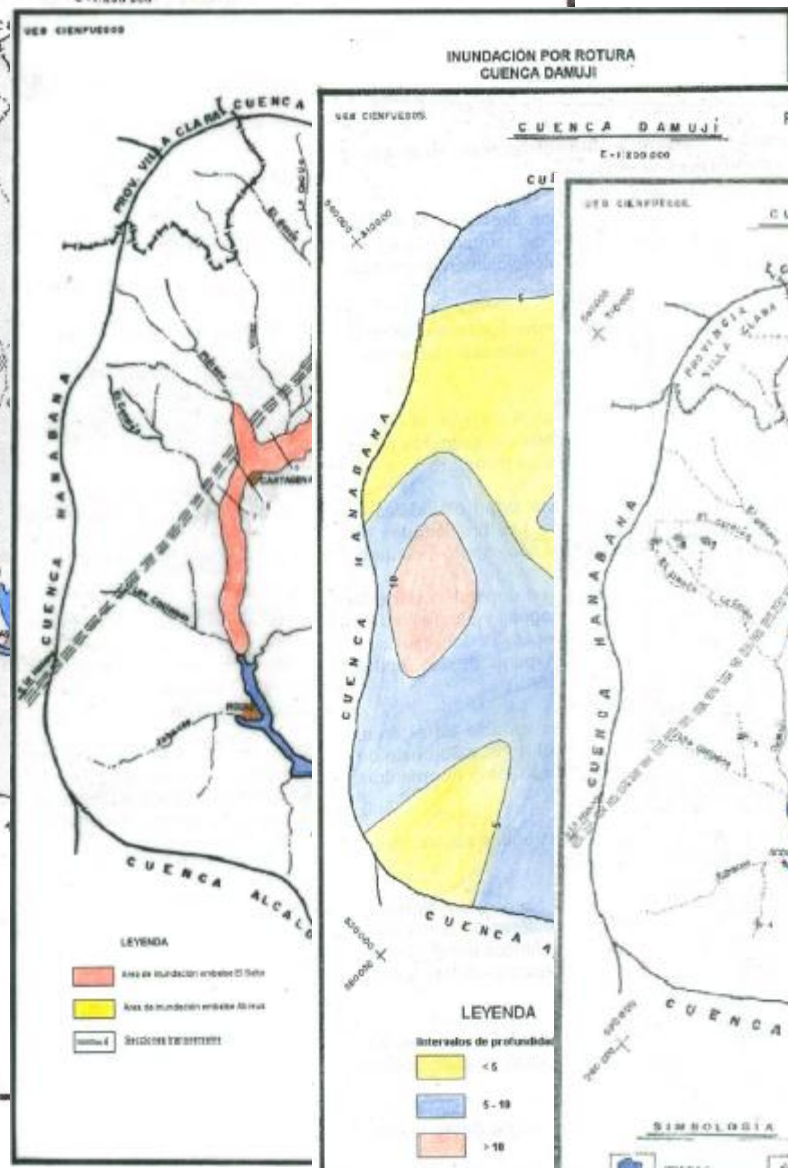
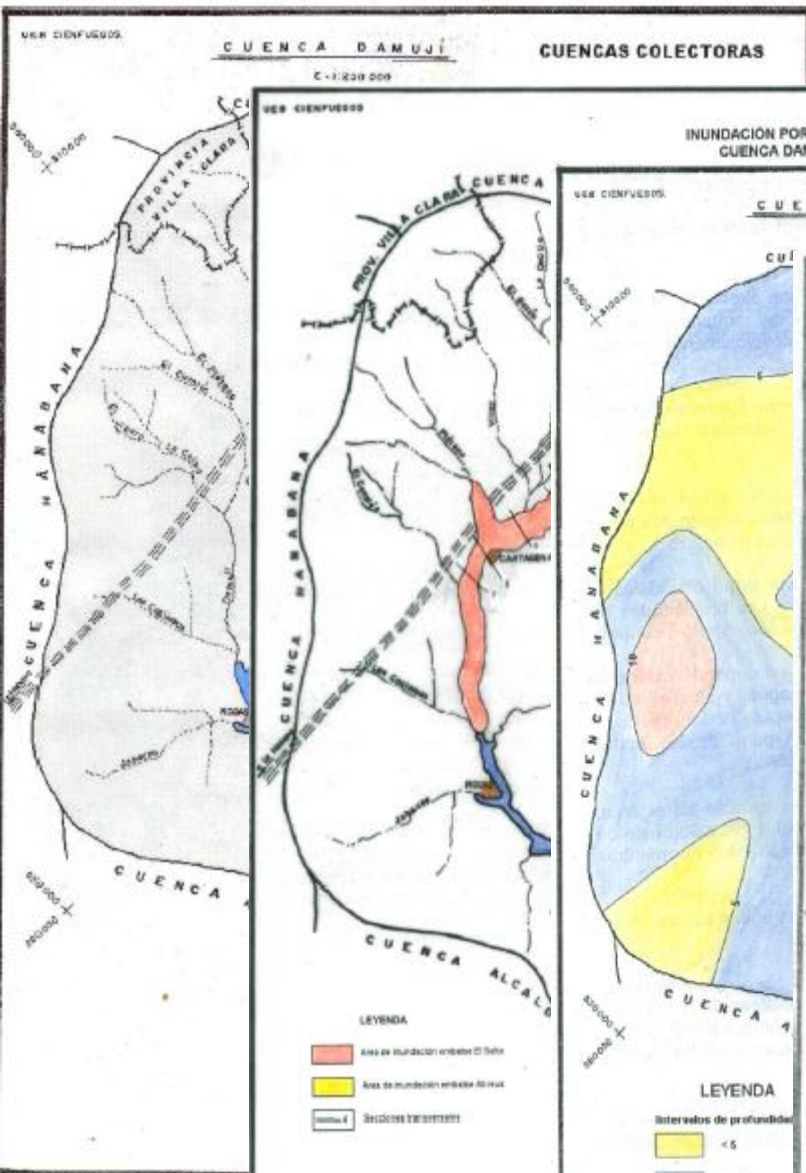
- Inserted, inside the basic courses “Current Issues on ICZM” and “Components and processes of the Coastal Areas”, conferences that include the importance of the basins, their management and their relationship with the coastal areas.
- Six students were guide toward the realization of theses related with the main hydrographical basins of the county and its interaction with the coastal area as a form of to guarantee a more effective environmental management and to obtain more update information that could helps to the plans of IWCAM in the territory.

2nd version of Master in ICZM (2004-2006)

- One of the theses, was based on one of the main river basins of the territory as a case study.
- It was guided to make a comparison fundamentally among the methodology of the “magic cube” (Dourojeanni, 2000) and other methodologies in use in the country the thesis was called “Proposal of methodology for the integrated management of hydrographic basins. Case study: Arimao Basin” (Mikulenka, 2006),

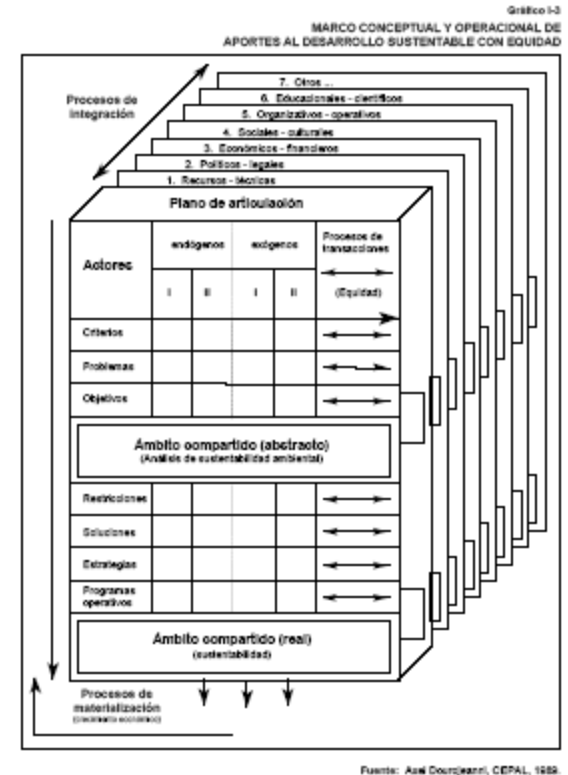


- The rest of the theses would try to apply the “magic cube” methodology in different basins of the province.



The method of the “magic cube”,

- Elaborate in 1976 and applied since 1977 to programs of Basins and Rural Development Management in the Height Andes in Peru, and from 1990 it was proposed by UN as a guide for the orientation of management process for development.
- In order to provide information to the management processes, necessary to define clearly the geographical areas and participation of all the involved actors.
- Alternative ways were suggested to solve the conflicts that arise about the economic growth, the social justness and the environmental sustainability, in agreement with the principle of sustainable development.



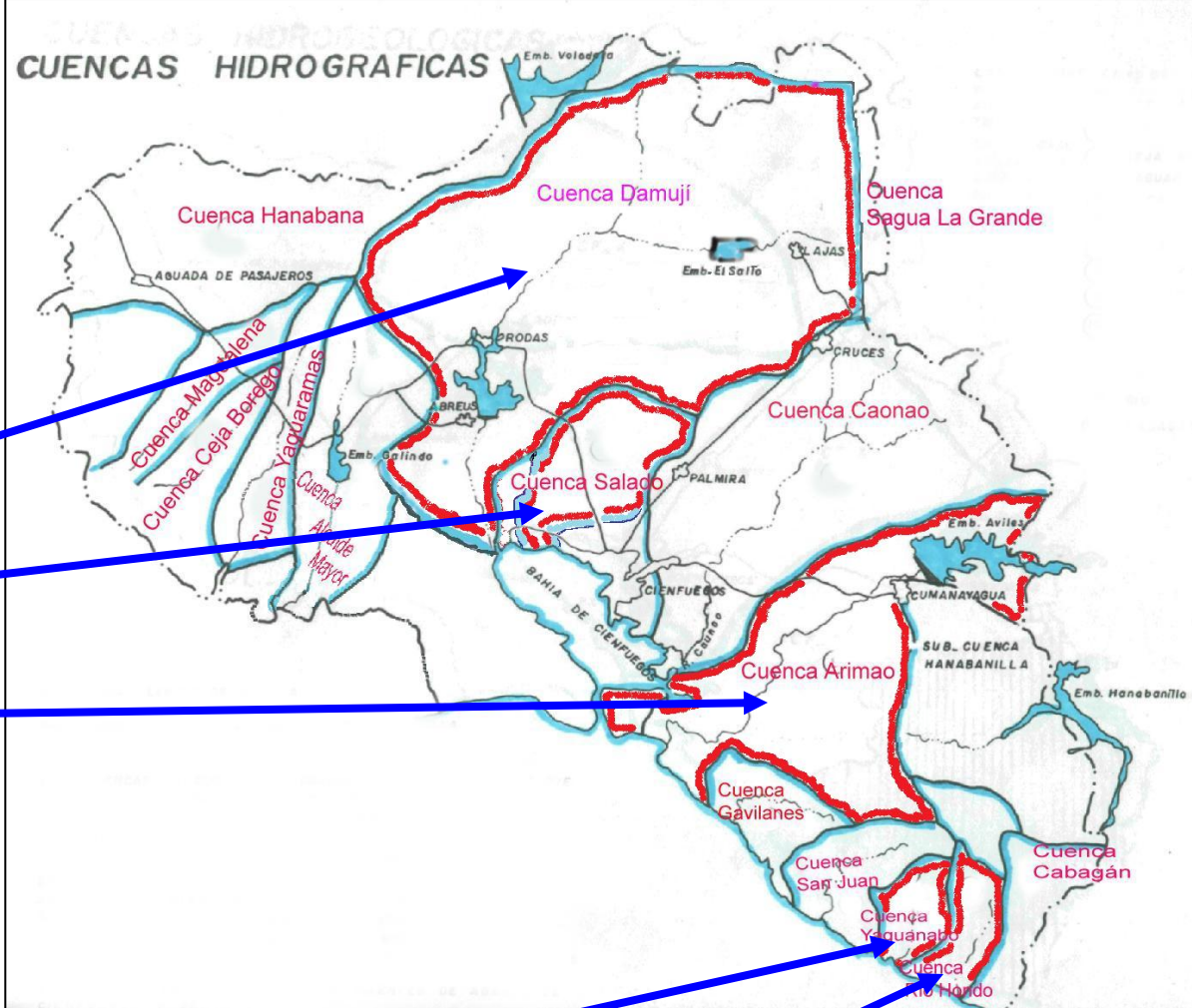
The method of the “magic cube”,

- 1st phase- Perception: where information is gathered about what the actors know by experience, intuition or direct observations about environmental problems and solutions.
- 2nd phase- Consolidation: in this phase the opinions are verified in the practice.
- 3rd phase– Formulation: studies are made and proposals are detailed formulated at the proper level.

The students worked on the first phase because the others required the direct intervention of the provincial government for their execution.

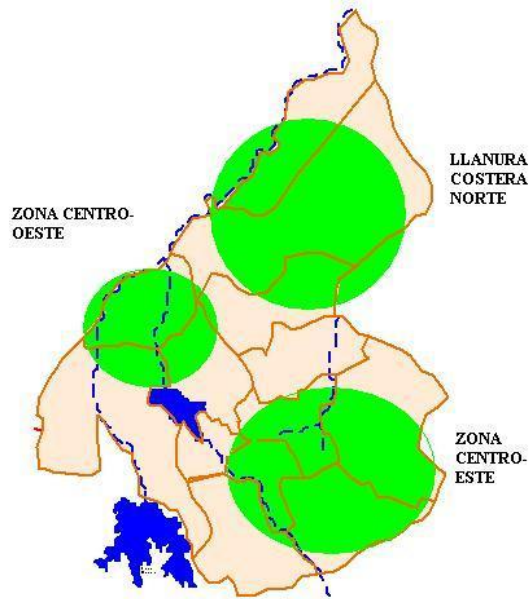
The studies are useful for IWCAM information and they have intended actions to diminish environmental problems in an area that embraces 47.6% of the province and a 39.7% of the population.

These theses executed an integrated diagnosis of the rivers basins Damují, Salado and Arimao, tributaries of Cienfuegos Bay



Also the basins of rivers Yaguanabo and Hondo, in the south slope of Guamuaya mountains group giving an idea of the mountain basins condition and their interrelation with the coast.

- A seventh thesis of this second edition, related with IWCAM, was the thesis with the name “Integrated Management Program of the water resource for the Sugar Enterprise José María Pérez, a contribution from IWCAM” that offers solutions for the management of the watershed in a sugar industry unit in the neighbor province of Villa Clara (Menejías, 2007)



Map of municipality of Camajuaní in Villa Clara Province with three zones that belong to the Sugar Enterprise José María Pérez.

UNIVERSIDAD “CARLOS RAFAEL
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CIENFUEGOS



*Tesis en opción al Título Académico de
Master en Manejo Integrado de Zonas Costeras*

Título: Propuesta de Programa de Manejo Integrado de Aguas para la Empresa Azucarera José María Pérez. Una contribución al MIZC.
Villa Clara.
Camajuaní.

Autor: Lic: Juan Gustavo Menejías Pérez.

Tutores: MSc. María Elena Castellanos
González

MSc. Fermín Sarduy Quintanilla
Dr. Eduardo López Bastida

Consultantes: MSc. Gabriel Alemañy Serafín.
Dr: Aldo Moya

CIENFUEGOS
DICIEMBRE / 2007

3rd version of Master in ICZM (2006-2008)



In Varadero beach, Matanzas Province, finished in 2008 but a few students still have not make the defense of their thesis. It was supported by entities as Playa Office of Ministry of Science, Technology and Environment (CITMA), Tourism Ministry (MINTUR) and inverters of tourism facilities in Varadero Beach.

This edition also incorporates concepts of IWCAM, but in general, this course is biased to beach quality conservation and tourism environmental problems.



4th version of Master in ICZM (2009-2011)

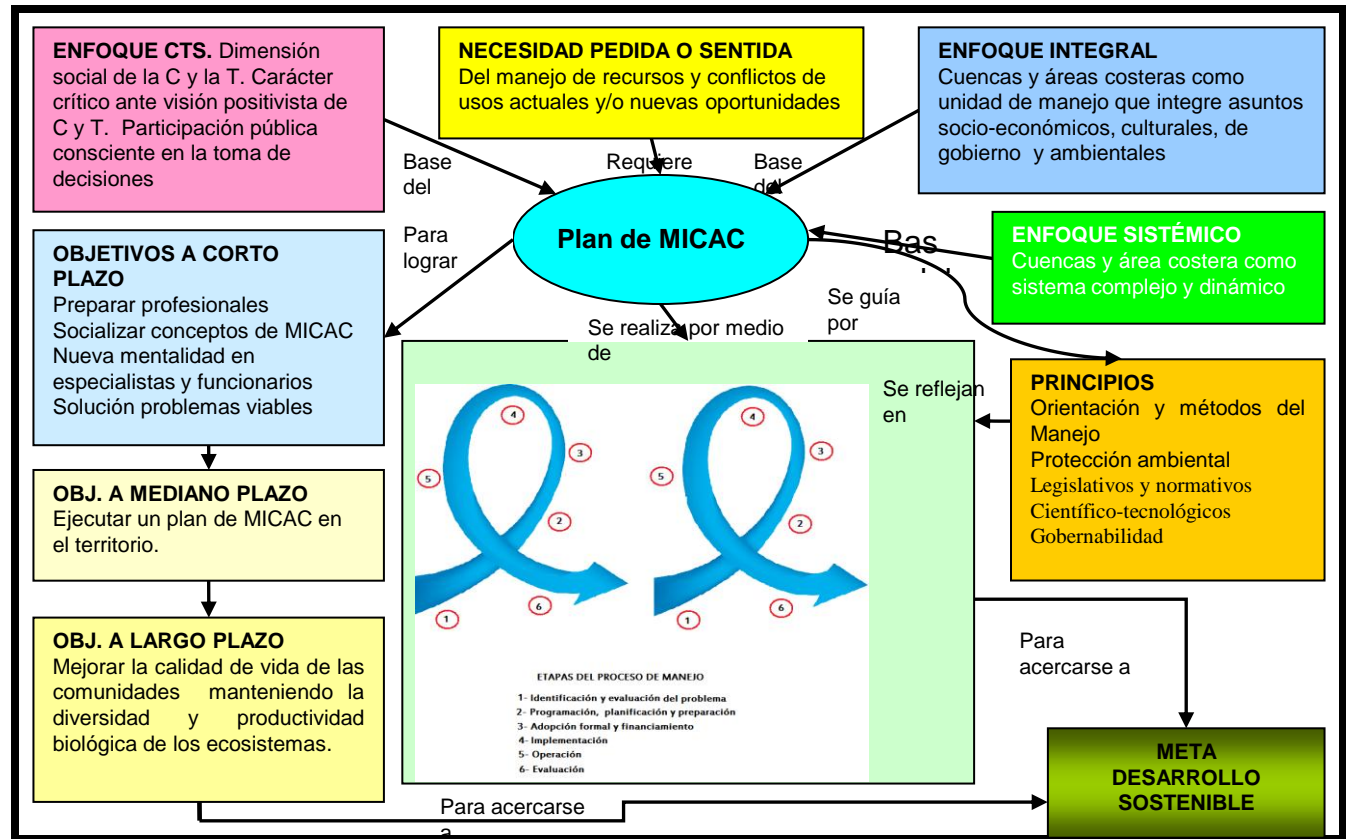
- The last edition is carried out in Cienfuegos, using the facilities build with the funds of the GEF-PNUD project, with the inclusion of the IWCAM concepts.



4th version of Master in ICZM (2009-2011)

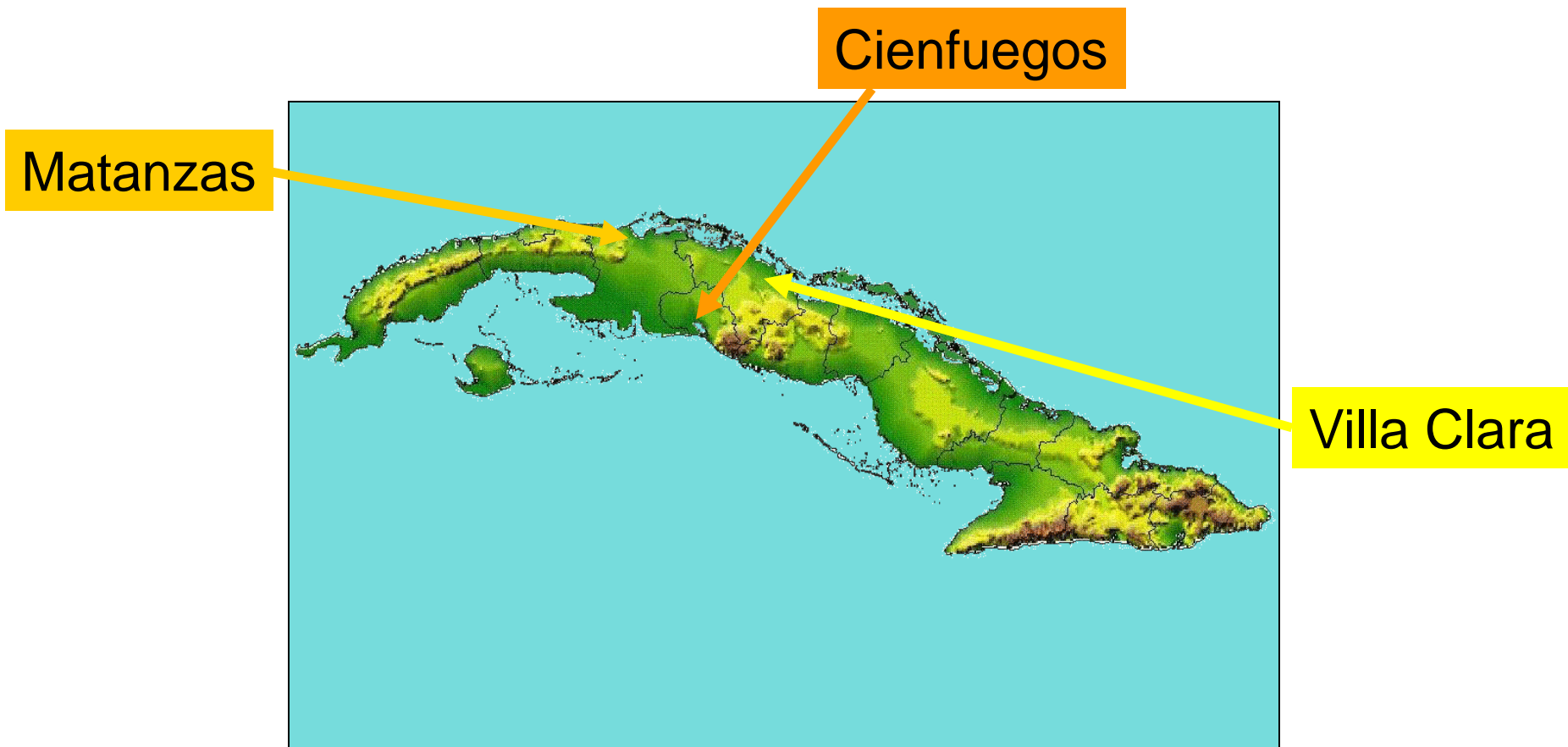
A model elaborate for the better comprehension, regarding the IWCAM process in Cienfuegos province, by the students was explained for the first time in class.

In the inquiry to the students of this edition, 100 % of them consider that this model reflex and interpret the IWCAM process in Cienfuegos.



Esquema del modelo de proceso del MICAC

- At present 25 alumni from Master in ICZM with IWCAM approach are working in different enterprises mainly in three central provinces.



Diploma course in IWCAM.

To amplify the diffusion of IWCAM it was offered a Diploma course in IWCAM in 2008 using facilities obtained with funds of the GEF-PNUD Project.

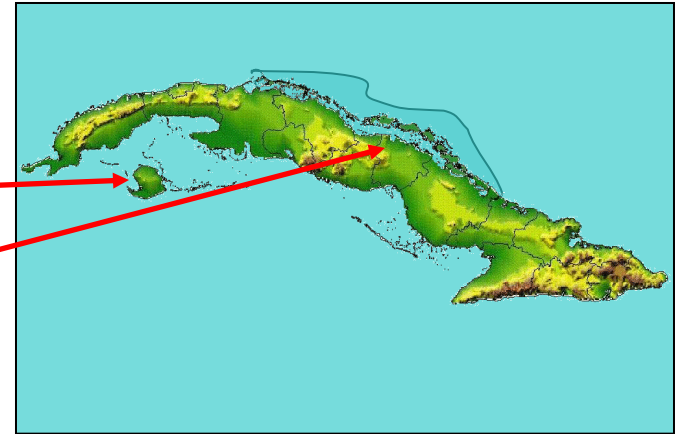
It was carried, under the direction of CEAC researchers, because CEAC was nominate as Authorized Center for Postgraduate Courses.



The final goal is the formation of a “critic mass” of educated persons with a change in the mentality toward a sustainable development. 26 students from 12 institutions in the province were graduated and 7 of them are now in the Master course in ICZM in Cienfuegos.

Future work.

Petitions of execution of Master in MIZC had been made by the special municipality of Pines Island and the Sabana-Camaguey Project.



A Diploma course in “Perfection with emphasis in training in Integrated Coastal Zone Management: Concepts and instruments” finished in May 2010 in the International Maritime University of Panama by professors of CEAC, it includes IWCAM perspective; petitions for the confection of a second diploma course has been made.

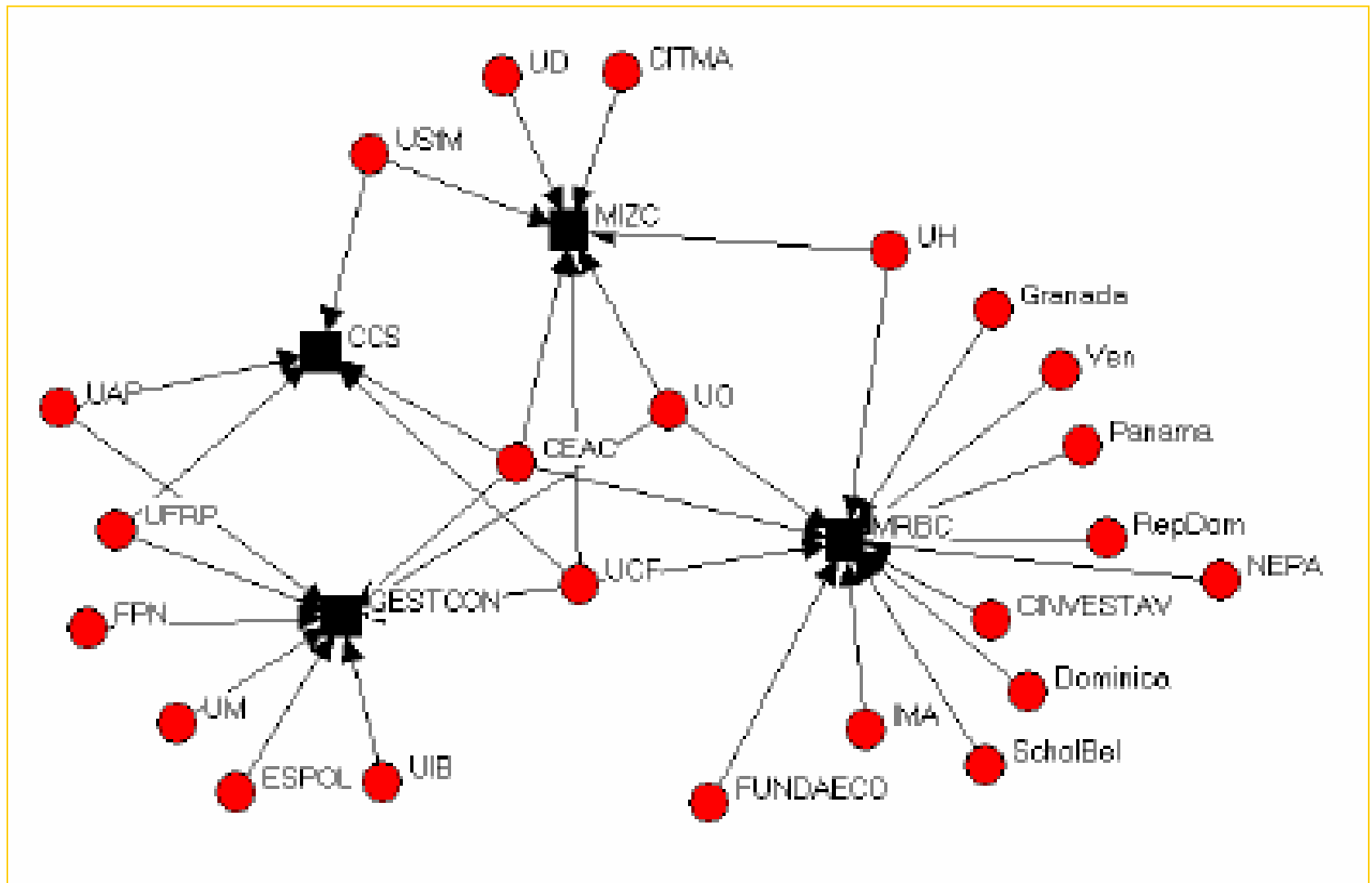


A new version of the Diploma course in IWCAM is in preparation to offer to tourism sector in Cienfuegos Province.

Net of knowledge in themes related with the IWCAM.

- The themes of IWCAM are now been spread trough the “**Ibero-American Net of Traditional Knowledge Management in Hydrographic Basins and Coastal Areas**” (**GESTCON**)
- Coordinate by specialist of CEAC and Cienfuegos University, with the participation of universities and institutions from six Ibero-American countries, funded in 2008 and financed by the **Ibero-American Program of Science and Technology for the Development (CYTED)**.
- It was formed thanks to the interpersonal and inter-institutional relationships raised in previous knowledge nets like the ICZM Net, formed by the universities included in the TIER II project; the Community Based Coastal Resource Management (CBCRM) Net and the Healthy Coastal Communities (HCC) Net

Net of knowledge in themes related with the IWCAM.



CONCLUSIONS.

- The capacity building in ICZM considering the concepts of IWCAM has influenced positively in the environmental management in Cienfuegos by increasing the number of specialists, researchers, functionaries and decision makers that could applied and spread this new form of integration.
- The studies executed by themes in the selected basins gathered valuable information for IWCAM and proposed remedial actions of environmental problems to an area of 47,6 % and around 39,7 % of the province population.
- The development of this conception of integration between river basins and coastal areas allow to elaborate a model, as a didactic tool, for the teaching of the IWCAM process in the postgraduate courses about these themes, offer by University of Cienfuegos and CEAC.

CONCLUSIONS.

- The regional “IWCAM in the Caribbean Small Island Developing States” project, incentive in a great manner the development of the concepts of integration through the demonstrative projects in Cienfuegos that improve the educational facilities and lessons about basic concepts of IWCAM approach.
- This IWCAM approach is already inserted inside an international net on environmental management; the “Ibero-American Net of Traditional Knowledge Management in Hydrographic Basins and Coastal Areas” (GESTCON) conformed by six Ibero-American countries.



Thanks for your patience

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