

COMBAT TO SOCIAL EXCLUSION, AWARENESS, AND ACTION THROUGH NUCLEAR ENERGY APPLICATIONS

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ABSTRACT

Gradually the world becomes more and more supportive and human. Small actions in our daily behavior contribute in a positive way to the social inclusion of people who has not the same opportunities due to physical appearance, social position or education level. The Companies, the basis of our Economy, can also demonstrate this social inclusion mission offering benefits that do not meet only one social layer, but everybody. This paper aims to make a research about the actions that have that awareness to combat social exclusion, emphasizing nuclear technology as a tool to disseminate of such solidarity actions.

1. INTRODUCTION

Social inclusion and exclusion, now a days, are issues that have gained prominence in our society and have been applied in several fields such as politics, health, sports, education, Economy, among others.

Starting from the concept of social inclusion as the acceptance of people with different characteristics and making them participants in the social, economic and political life. Besides that, assuring respect to their rights in the society as well.

Unlike social exclusion, which can be defined as a combination of multiple privations, such as lack of personal opportunities, lack of economic and financial means social isolation and limited access to social rights.

The society gradually has contributed to some actions that encourage social inclusion and fighting against social exclusion. Economic development, environment and energy, are strongly connected to these subjects, and somehow they aim to achieve positive actions from the population, producing well-being and quality of life.

2. OBJECTIVES

The aim of this study is to demonstrate the extent of social inclusion, which is beyond referring people with physical characteristics, but there are broader concepts on the subject. This study also aims to do a research about the actions that have this awareness of social inclusion and exclusion, emphasizing the drag and technological applications of nuclear energy for the benefit of all.

3. THEORY SUMMARY

3.1. Social inclusion and exclusion

Social inclusion generally refers to the people with special educational needs insertion in the regular schools, employment of handicapped people to the companies working the any other employee and also inclusion of people with no opportunity due to poor social economic condition, gender, race or no access to the technology (digital exclusion).

The process of social inclusion of people with special needs became effective from the 1994 Salamanca's Declaration, which is the United Nations resolution supported by the Child Rights Convention (from 1988) and the Education for All Declaration (1990) [1].

The basis of the Salamanca's Declaration is: every child has the right of education as the mean to obtain an adequate development, where individual characteristic, abilities and needs will be respected. So, the Educational system shall be organized to provide conditions for students with special needs be attended [2].

From the social exclusion and inclusion concept is observed an evolution depending on the time and condition. Tables 1, 2, 3 and 4 showed below present a compilation of Inclusions and Exclusions definitions [3] and relevant factors.

Table 1: Social Inclusion definitions summary

Social Inclusion	Source
Process that assure that people in severe poverty condition and social excluded may have opportunities and necessary means to participate economically, socially and culturally and also take benefits of life and welfare of a normal life in the society [4].	COM, 2003
Social policy that prioritize, erroneously, reach the excluded person who is in the limit of privations by programs that got a label as for "social inclusion" [5].	Lopes, 2006
Programs that try to promote the inclusion of segments on social vulnerability. Focusing cities, schools, employment and social protection [6].	Kowarick, 2003
Referring to social solidarity which a different process from social exclusion, and shows companionship [7].	Barry, 1998
It a question of opening up and management: Opening up,	

understood as the sensitivity to identify and catch up all kind of dissatisfaction manifestation and social actions, to recognize the social and cultural diversity. Management understood as belief in a character quantifiable and operation ability of such questions and managed by means of management techniques and resources in some projects and programs (public policy) [8].	Laclau, 2006
Process to make the social exclusion milder. Process that aims to look for the reduction of social differences by improving wage and employment [9].	Wixey et al., 2005
The social inclusion is related to the searching of the social stability by the social citizenship, it means, every citizen has the same rights in the society. The social citizenship objective is to provide the welfare to the people [10].	Sheppard, 2006

Table 2: Social Exclusion Definitions

Social Exclusion	Source
Process where people is moved from the society and forbidden to participate due to his poverty, inabilities and non-opportunities to get knowledge along the life, or even as a result of pure discrimination [11].	COM, 2003
Social exclusion can be defined as multiple privations resulting from the lack of personal, social, policy or economical opportunities. The social exclusion point out the non adequate social participation, non-integration in the society and lack of energy [12].	Hunter, 2000
At century 14 th , the social exclusion was associated to the no admittance or non acceptance idea. It means somebody that has no rights [13].	Kowarick, 2003
Marginalization of people or social group compared to the ones competitive, productive and successful [14].	Proença, 2005
The exclusion of a social group or some people that belong to this group is mainly a negation of respect, recognition and rights [15].	Silver, 2005
Social exclusion also means groups socially excluded. Therefore, related to the ones living in the strong poverty, unemployed and living under the lack of multiple needs and are deprived from their rights as citizen [16].	Sheppard, 2006

Table 3: Social Inclusion Factors

Social Inclusion Factors	Source
Institutional programs to reduce the social exclusion [17]	Lopes, 2006
Social justice and solidarity [18].	Barry, 1998

Safety, protection, social security, democratic rights and opportunities to the political participation [19].	Sen, 2000
An Improvement of human capacity by means of educational program, training and better quality of employment can significantly contribute to social inclusion enhancement [20].	Mazza, 2005
Employment re-allocation, social solidarity [21].	Lesbaupin, 2000
Value improvement of people independent of ethnic, religion, gender and age. Access to some means which permit choices, decisions on everything that affects themselves and opportunities and resources to participate in the society to get [22].	Wixey et al., 2005

Table 4: Social Exclusion Factors

Social Exclusion Factors	ationSource
It is characterized by a set of phenomena in the social relationship field: the structural unemployment, the substandard working conditions; the social disqualification; people homeless; the hunger; the violence; non access to the services; the security; the justice and citizenship [23].	Lopes, 2006
Poverty, the hunger, the educational inequality; .the social justice violation and the social solidarity [24].	Barry, 1998
Poverty and capacities privation (hunger, people homeless, unemployment and loss of freedom) and exclusion of the government process [25].	Sen, 2000
Employment inaccessibility – incapacity to generate income non-valorization or lack of recognition of the daily effort, no basic legal protections and n of the employment. To these effects are included phical segregation in non-recognized communities, the social effects due to the poor employment, unsafely work condition and dropout from school [26].	Mazza, 2005
Unemployment, poverty, inaccessibility to multiple citizen needs and rights [27].	Lesbaupin, 2000
Poverty, unemployment, inaccessibility to multiple needs associated to the privation of rights [28].	Sheppard, 2006

The actions against social exclusion can be accomplished by means of a preventive intervention and mobilization of public policies for jobs, wages, health, education, social action among others.

Some of classical exclusion factors as poverty, unemployment, health care and education are still in evidence in our current society [29].

3.2 Poverty

The poverty, in a general mean, is the Word used to describe the income level which a person or a family do not have the minimum condition to get the necessary resources to live. The lack of the resources or income is one of the factors that deter mine the social exclusion. It affects mainly the most fragile people due to the poor financial conditions [30].

In the World Conference on Social Development in 1995 in Copenhagen was established that absolute poverty is the extreme or severe privation of basic human needs, including: food, safety, potable water, sanitation, health, housing, education and information [31].

It is considered relative poverty when the income and resources of an individual or community are inadequate to have a standard of life considered acceptable in the society [32]. Conditions that can trigger various unfavorable situations, such as unemployment, low income, poor housing, inadequate health-care, barriers to learning, culture, sport and leisure, leading to exclusion and marginalization of those involved, depriving them of participate in economic, social and cultural.

3.3 Unemployment

The social monetary transferences actions reduce the risk of poverty, but do not eliminate it. The solution of the social problems combines tasks related to monetary transferences associated to programs that include healthcare, education and possibility to acquire a house.

Besides that, it is necessary to establish conditions to have a reasonable stability and quality of employment for men and women, once the unemployment and poor work conditions are examples of the problems that drive to the social exclusion [33].

The social inclusion by means of employment, improves the participative involvement of the whole society, once the employment generates the decision capacity, choices related to the natural resources use and citizenship exercising.

3.4 Healthcare

The results expected from health people are related to the factors associated to the lifestyle and access to the healthcare programs. The social exclusion can be started to by health problems or at least can become more serious affecting people quality of life.

3.5 Education

The low level of scholarship and illiterate people are most of time the problems to the employment and professional improvement. Generally, a higher levels of education reduces the risk of unemployment.

The implementation of programs with co-participation of companies and civil society are, in general, an option to contribute to the quality of education and several times, stimulating the learn capacity over the whole life [34].

4. APPLICATIONS OF NUCLEAR ENERGY

Among several fields of knowledge which contributes to the social inclusion and fight to the social exclusion, the nuclear area has contributed to minimize this global scourge.

Unfortunately the benefits of the nuclear energy are not divulgated. Everyday new technologies involving nuclear energy are developed in several human activities fields, making feasible some activities that would be impossible to do by conventional means. The medicine industry, in special the pharmaceutical one and the agriculture are examples of area with more benefits [35].

The benefits of Nuclear energy in some classical factors of social exclusion are showed as follow:

4.1 Applications of nuclear energy in the mediation of coping factor social

The first action to fight the poverty is the nation development, and this is directly related to the offer of electric energy. All factors of social exclusion, to its elimination or mitigation, need a greater offer of electric energy to improve employment; to supply homes, hospitals, schools in operation in the Country. In this aspect the Nuclear Power plant assumes its function.

The poverty is a problem that affects the whole world, and in several countries there are people who live with less than one dollar per day. It is estimate that in the whole world there are one billion of hunger persons (as per *Action Aid* (Non-governmental International Cooperative Organization)) [36].

In Brazil, even with the economical, social and technology advances, the lack of food affects thousands of people. This process is a result to the income disequilibrium. The number of hunger people reaches 32 million and 65 million of people do not have even the minimum daily recommended quantity of calories, it means they have very poor meals [37].

In the fight of the lack of food for Brazilians, several segments of the society are contributing as they can. The nuclear area invests in the agriculture area with applications that benefit directly the production and also in already package products.

Products from animal origin and vegetables can resist more time when submitted to very low portion of radioactivity.

The irradiation on food, the very low portion of radiation applied is calculated in such a way that eliminate bacteria, fungus and many others microorganism without affecting the taste, nutrition value and many others food characteristic. Some of results are the retardation of

maturation and the reduction of diseases transmissibility. A mature papaya, for example, would have, maximum, one week to be consumed before becomes rotten.

The irradiation has approval from FAO (United Nations United for Agriculture and Food), organization from UNO (United Nations Organization) responsible for food programs and agriculture, reaching more than 50 countries. Around the world is used in almost 40 types of food like grains, food flavoring, meat, fish, eggs, fruits and vegetables. There are five commercially foods irradiators used in Brazil, three in São Paulo, one in Rio de Janeiro and Belo Horizonte in another [38].

4.2 Applications of nuclear energy in the mediation of coping factor social exclusion:

Unemployment

The nuclear area also contributes to combat social exclusion related to unemployment, and on this subject are highlighted examples such as Nuclear Power Plant Angra dos Reis, the Navy Nuclear Program and institutes of CNEN.

For the communities around the Brazilian nuclear power plant, at the Angra dos Reis city (south of state), the presence of the nuclear power plant generally represents benefits. According to Evandro Vieira, president of village association and Frade's friends (village near to nuclear power plant). Most of people that live in the community work at the nuclear power plant [39].

In the Fig. 1 is shown photography of Angra dos Reis (RJ) nuclear power plant. [40].



Figure 1: Angra dos Reis Nuclear Powerplant

The second example is the Navy Technological Center in São Paulo (CTMSP), developed and administered by the Brazilian Navy, where the nuclear fuel cycle has been deeply studied.

From uranium ore produced at the Caetité mine (BA), through high quality materials and advanced electronic means, the Brazilian Navy is building a nuclear reactor that will equip the Brazilian fleet of nuclear submarines.

These reactors of ultimate generation may be available to generate electricity in power plants to be installed in remote areas of the country with the greatest shortage of electricity. The CTMSP employs people with complete high school and also bachelors and post graduated workers, mostly in the region of São Paulo and Sorocaba [41].

As previously mentioned, the availability of abundant electricity provides means to industry development and consequently social inclusion by employment increasing.

The Brazilian committee (CNEN – Comissão Nacional de Energia Nuclear) and its institutes employ directly about two thousands workers and other two thousands indirectly. The CNEN Educational programs have more than one thousands students and student workers since the scientific initiation to the post-PHD degree.

4.3 Applications of nuclear energy in the mediation of coping factor social exclusion:

Health

One of most known radiotherapy device is the “Cobalt Bomb” used in Cancer therapies. This device is really not a “bomb”, it does not blow up. It is really a radioactive source of Cobalt-60 (Co-60), encapsulated or sealed and armored to avoid radiation leaking. Sources of Cesium-137 were recently replaced by Cobalt-60 due some technical reasons and because the latter is more effective in cancer therapy. At the beginning of the application, the source is moved from its safe position inside the protected head (made of lead and stainless steel), to the front of very small hole, that allows a concentrated radiation bundle to pass through the hole over the surface to be treated or irradiated. Finished the application the source returns to the original position safely [42].

The Iridium-192 and the Iodine-125 are also used on medical therapies; the former is used to treat precocious tumor and the latter to treat prostate cancer.

The CNEN produces several types of radio-medicine and radio-isotopes, contributing to benefit the society.

Objecting to make Brazil autonomy in production of radio-isotope, the Brazilian commission (CNEN) is building a powerful reactor of 30MW with a Fast Neutron thermal flow of $2.0 \cdot 10^{14}$ Neutrons/cm².s. This reactor, nominated as “Multipurpose Brazilian Reactor” – MBR, is an investment of 500 million dollars and has objectives as follow [43]:

- To produce Radio-isotopes for health application, industry, agriculture and environment;
- Irradiate materials and nuclear fuels in such a way it allows the analysis, performance and behaving under several irradiation fields of a nuclear reactor; e
- To do some scientific and technology researches and with neutron bundle.

The social exclusion may be supposed to generate health diseases and the nuclear energy applications in the medicine field allow the users to have better quality of life.

4.4 Applications of nuclear energy in the mediation of coping factor social exclusion:

Education

Actions to disseminate the nuclear science and technology, especially to the students, have been performed by IPEN (Nuclear Energy Research Institute – Instituto de Pesquisas Energéticas e Nucleares in Portuguese). Such actions are performed by visiting to the research reactor – IEA-R1 and to the Radio-pharmacy center, by presentations and debates in colleges, by publishing scientific material of nuclear energy and creation of special centers for public access.

At the Nuclear Technology Development Center (CDTN – Centro de Desenvolvimento da Tecnologia Nuclear) localized inside the Minas Gerais Federal University, from 1998 on, started the program CDTN – opened door. It is a one day event, when the institute opens the door to the general community, mainly high school and college students. Since 2000, the results of attendance for this segment of the public have been registered and showed by some indicators. In 2004, an analysis of such results showed that most of time the attendance to private schools were much higher than the one to public schools. A directive of the institution was done: to increase the attendance to public schools in order to try to improve the social inclusion. However, a limitation on the number of visitors in the laboratories at the same time prevented the directive to be applied. The auditory with small capacity, the lack of resources to transport the students from/to their schools were also the problems to prevent the directive application. For such reasons, a project called “Itinerante” was created in order to improve the attendance to public schools by the CDTN.

The project was pioneer by using the nuclear technology as the mean to create a new feeling to the students starting more interest to the science study. Some of speeches got 94% of approval and 55% of the student demonstrated interest to study the subject deeper. From this Survey can be realized that the theme “Nuclear bomb” or “Nuclear war” got the second place (19.8%) and the using and applications of the nuclear technology for other purposes got the first place (42.6%).

By providing the access to nuclear technology fundamentals, focusing themes as risks of hazards, benefits, radiation protection, etc, the project also contributed to create conditions to the students to exercise their citizenship and become them capable to question, consciously, the nuclear application [44].

The nuclear energy benefits diffusion inside the society allow that more and more people be aware of them generating better conditions for everyone.

5. CONCLUSIONS

Through this work, we can say that, in addition to public policies that induce the process of awareness for effective actions to combat the factors of social exclusion is necessary to

expand this concept in the different segments of society, through their respective agents and social facilities such as businesses, schools, hospitals, banks and others. This expansion of the concept of social inclusion / exclusion allows the realization of measures of human development index: physical (food, health, transport, etc.), social (access to information, global communication, etc.), cultural (image of the world, job satisfaction, etc.) and political (national autonomy, the country's role in the world, etc). In this context, it is understood that the applications of nuclear energy provide many benefits to society.

Finally, to complete the conclusion, it is worth mentioning that the development of the national energy matrix and its consequently improve on technological knowledge, including the nuclear energy constitutes one of the pillars of national growth and the economic and social development, contribute significantly to addressing the factors of social exclusion. Therefore promotes the inclusion of socially vulnerable segments, highlighting the city, school, employment and social protection with the implementation of the welfare of the people as citizens.

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