SOCIO-ECONOMIC AND POLICY-INSTITUTION ISSUES AND CHALLENGES IN SUSTAINABLE DEVELOPMENT OF PRESSURIZED IRRIGATION SYSTEMS IN IRAN

SOCIO-ECONOMIQUES ET LES QUESTIONS DE POLITIQUE-INSTITUTION ET LES DEFIS DANS LE DEVELOPPEMENT DURABLE DES SYSTEMES D'IRRIGATION SOUS PRESSION EN IRAN

Nader Heydari [1] , Hossein Dehghanisanij [2]

ABSTRACT

Sustainable development of pressurized irrigation systems is a key to mitigate the crises of water scarcity, mainly because of more demand for food, in Iran. However, despite the importance of the issue, little areas of lands are equipped with the pressurized irrigation systems. Moreover to the different technical, technological, and infrastructural problems and challenges associated with the sustainable development of pressurized irrigation systems in Iran, socio-economic and policy-institution issues and problems are among the important cases. Therefore, the objective of this research project was to systematically identify the socio-economic and policy-institution problems, issues, and challenges associated with the sustainable development of pressurized irrigation systems in Iran. The methodology of the program was fully participatory, with the participation of representatives of different stakeholders in the water and the agriculture in general, and the experts, and resource persons in pressurized irrigation enterprise of the country in specific. Based on the results, the main socio-economic and policy-institution problems hindering sustainable development of pressurized irrigation systems in Iran could be categorized in the following categories: Economic and finance problems (including national economy, costs to the beneficiaries, banking and finance and credit issues), socio-cultural problems (including socio-cultural basis and capacity building, inefficiencies in adaptation of the systems, and weaknesses in agricultural production systems), policy and institutions issues (including organizational and human resource structures weaknesses, and problems associated with the policy and planning, inefficiencies in motivation of beneficiaries willingness toward acceptance and adaptation of the systems). Quantity basis, the identified problems were totally 88 cases, of which the economic-finance, socio-cultural, and policy-institution problems, included 39.8, 29.5, and 30.7 percent of total problems respectively.

Keywords: Pressurized irrigation, Socio-economic, Policy-Institution, Sustainable development, Problem, Challenge

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1 - Assistant Professor, Irrigation and Drainage Department, Agricultural Engineering Research Institute (AERI), P. O. Box 31585-845, Karaj, Iran, Fax: +98-261-2706277, Email: nrheydari@yahoo.com (Corresponding author)

2 - Assistant Professor, Pressurized Irrigation Systems Department, Agricultural Engineering Research Institute

RESUME ET CONCLUSIONS

I.R. d'Iran est situé dans l'une des régions les plus arides du monde. Le secteur agricole est l'un des secteurs économiques les plus importants en Iran. Compte tenu de la production agricole totale irriguée en Iran (70 millions de tonnes) et les ressources en eau totale consommée dans l'agriculture (84 BCM), la productivité de l'eau agricole (WP) en Iran est à peu près 0.8 à 1.0 Kg/m^3. C'est en vertu de situation que pour combler les besoins alimentaires du pays avec une population de plus en plus, la valeur WP au moins devrait atteindre 1.6 kg /m^3 jusqu'à l'année 2025.
Dans ces circonstances, le développement durable des systèmes d'irrigation sous pression est un élément clé pour atténuer ou du moins à atténuer les crises de pénurie d'eau et l'amélioration de WP en Iran. Cependant, malgré l'importance de la question, les zones peu de terres (10.2% du total des superficies irriguées) sont équipées avec les systèmes d'irrigation sous pression et il ya encore loin d'atteindre le niveau souhaité.
Les raisons apparentes pour le développement déséquilibre des systèmes d'irrigation sous pression et le grand écart disponible ici en ce qui concerne les superficies totales irriguées du pays (8.2 millions ha), peut être évaluée à partir de la mauvaise conception et la mise en œuvre, la faible qualité des dispositifs et des équipements, mauvais fonctionnement et la gestion des systèmes, la quantité et la qualité de l'eau d'irrigation, et d'autres questions, par exemple le vol et vendre des équipements. Cependant, il semble que les raisons sont plus fondamentales. En d'autres termes différents problèmes techniques, technologiques, et de l'infrastructure et les défis sont liés au développement durable des systèmes d'irrigation sous pression en Iran, parmi eux culturel et socio-économiques et les questions de politique-institution et les problèmes sont les cas les plus importants. Par conséquent, l'objectif de ce projet de recherche était d'identifier systématiquement les problèmes socio-économiques et les problèmes politiques institution, et les défis associés au développement durable des systèmes d'irrigation sous pression en Iran.
La méthodologie du programme a été pleinement participative, avec la participation de représentants des différentes parties prenantes dans l'eau et l'agriculture en général, et les experts et personnes ressources dans l'entreprise d'irrigation sous pression du pays en particulier. L'approche ISNAR a été utilisé ici. Les experts ont été réunis et ont participé dans le cerveau différentes réunions méninges pour identifier les problèmes pertinents, les enjeux et les défis.
Les résultats de la recherche ont été principalement sous la forme d'arbres problème. Toutefois, les problèmes identifiés ont été également accordé la priorité, en fonction de leur importance, et enfin quelques pivots stratégiques connexes ont également été développés.
Basé sur les résultats, les principaux socio-économique et des problèmes politiques qui entravent le développement durable institution de systèmes d'irrigation sous pression en Iran pourraient être classées dans les catégories suivantes: les problèmes économiques et des finances (y compris l'économie nationale, les coûts pour les bénéficiaires, la banque et la finance et des problèmes de crédit), les problèmes socio-culturels (y compris la base socio-culturelle et le renforcement des capacités, les inefficacités dans l'adoption des systèmes, et les faiblesses dans les systèmes de production agricole), les questions politiques et institutions (y compris les faiblesses organisationnelles et humaines des structures des ressources, et les problèmes associés à la politique et de planification, de l'inefficacité de la motivation de la volonté des bénéficiaires vers l'acceptation et l'adoption des systèmes).
Selon la quantité, l'économie-finance, socio-culturelles, et les problèmes politiques institution, inclus 39.8, 29.5 et 30.7 pour cent du total respectivement problèmes.
De les aspects stratégiques, les résultats de cette recherche indiquent que les stratégies suivantes devraient être mises en œuvre dans le pays pour le

développement durable de l'irrigation sous pression à partir des aspects les institutions socio-économiques et politiques: 1) Une plus grande implication du secteur privé dans les systèmes d'irrigation sous pression et le développement donc le désengagement du gouvernement 2) Une plus grande attention aux économies d'énergie dans les systèmes, compte tenu de la demande croissante des prix de l'énergie et augmenter l'énergie de se produire dans un proche avenir 3) Sélection des critères économiques dans la priorité au développement des systèmes d'irrigation sous pression dans les différentes régions, et 4) Plus d'objet d'études de recherche et les plans sur les mesures pour la justification économique de l'utilisation de systèmes d'irrigation sous pression dans les petits systèmes agricoles échelle.

1. INTRODUCTION

Efficient use of water resources and improving water productivity (WP) is one of the important issues and priorities of the I.R. of Iran, especially in the last two decades. This is highlighted in the national policies and in the different five years national development plans of the country.

Development of water saving irrigation systems and technologies, especially pressurized irrigation systems in the irrigated area, has been one of the important options of the policy makers and planners in the agricultural sector. However, despite considerable attention to the sustainable development of pressurized irrigation systems in Iran, still the irrigated lands equipped with these systems, only cover 10.2 percent (0.89 millions ha) of the total irrigated areas (8.7 millions ha) of the country (Anonymous, 2004, 2005, 2008, 2010). In table 1 the extent of development of pressurized irrigation systems in the different national development plans of the country is provided.

Table 1: Trend of development of pressurized irrigation systems in Iran (Evolution du développement des systèmes d'irrigation sous pression en Iran)

National development plans	Planned (Thousands of Ha)	Achieved (Thousands of Ha)	Percent of Achievement (%)
1st Plan and before (1990-94)	277	67	24.2
2nd Plan (1995-99)	807	204	25.3
3rd Plan (2000-04)	609	216	35.5
4th Plan (2005-09)	500	381	76.2
5th Plan (2010-14)	1000	74.8*	7.5

*: This plan is not officially started yet and the data are just for the start of the year 2010

Based on the values in the table 1, it is evident that still there is a big gap, and lots of works are required to considerably develop these systems in the country.
There are different reasons for slow progress of the sustainable development of pressurized irrigation systems in Iran. Different studies (Anonymous, 2004, 2005, 2008) have shown enormous challenges, including improper use of available resources, socio-economical issues, policy making, quality of equipments, production

technology, design, and operation and management (O&M) of the established systems, in this regards.
These problems and issues could be categorized in four main categories including, technical, adaptation and technology transfer, infrastructures, resources, and socio-economic and policy-institution issues (Dehghanisanij et al., 2010). However, moreover to the different technical, technological, and infrastructure problems and challenges associated with the sustainable development of pressurized irrigation systems, socio-economic and policy-institution issues and problems are among the important cases.
Various researches and studies have been also conducted to overcome these issues and challenges. However, most of them were case specific and do not faced with the issue, holistically. Therefore, for the purpose of efficient use of water and sustainable development of pressurized irrigation systems, a comprehensive research was conducted to systematically study the socio-economic and policy-institution problems, issues, and challenges of the sustainable development of pressurized irrigation systems in Iran. Moreover, some strategies require to handle the issues, were also developed.

2. MATERIALS AND METHODS

The methodology of the study was fully participatory, with the participation of representatives of different stakeholders in the water and the agriculture in general, and the experts, and resource persons in pressurized irrigation enterprise of the country in specific. The ISNAR[1] approach was used here.

Through facilitated brain storming meetings and harvest of the ideas of the experts and resource persons participated, the socio-economic and policy–institution problems, issues, and challenges associated with the sustainable development of pressurized irrigation systems were systematically identified. The experts were gathered and participated in the different brain storming meetings to identify the relevant problems, issues, and the challenges. The research outputs were mainly in the form of problem trees. However some related strategic executive and research pivots and objectives were also developed.

The involved stakeholders consisted from the ministries of agriculture and energy, water board organizations and departments, universities, planning and economics departments, consultant engineering, national research institutes and centers, agricultural banks, extension services, and finally farmers NGO's.

3. RESULTS

In figures 1.a. to 1.c results of brain storming meetings and discussions, which are synthesized in the form of problem trees of sustainable development of pressurized irrigation systems, are provided.

1 -International System of National Agricultural Research

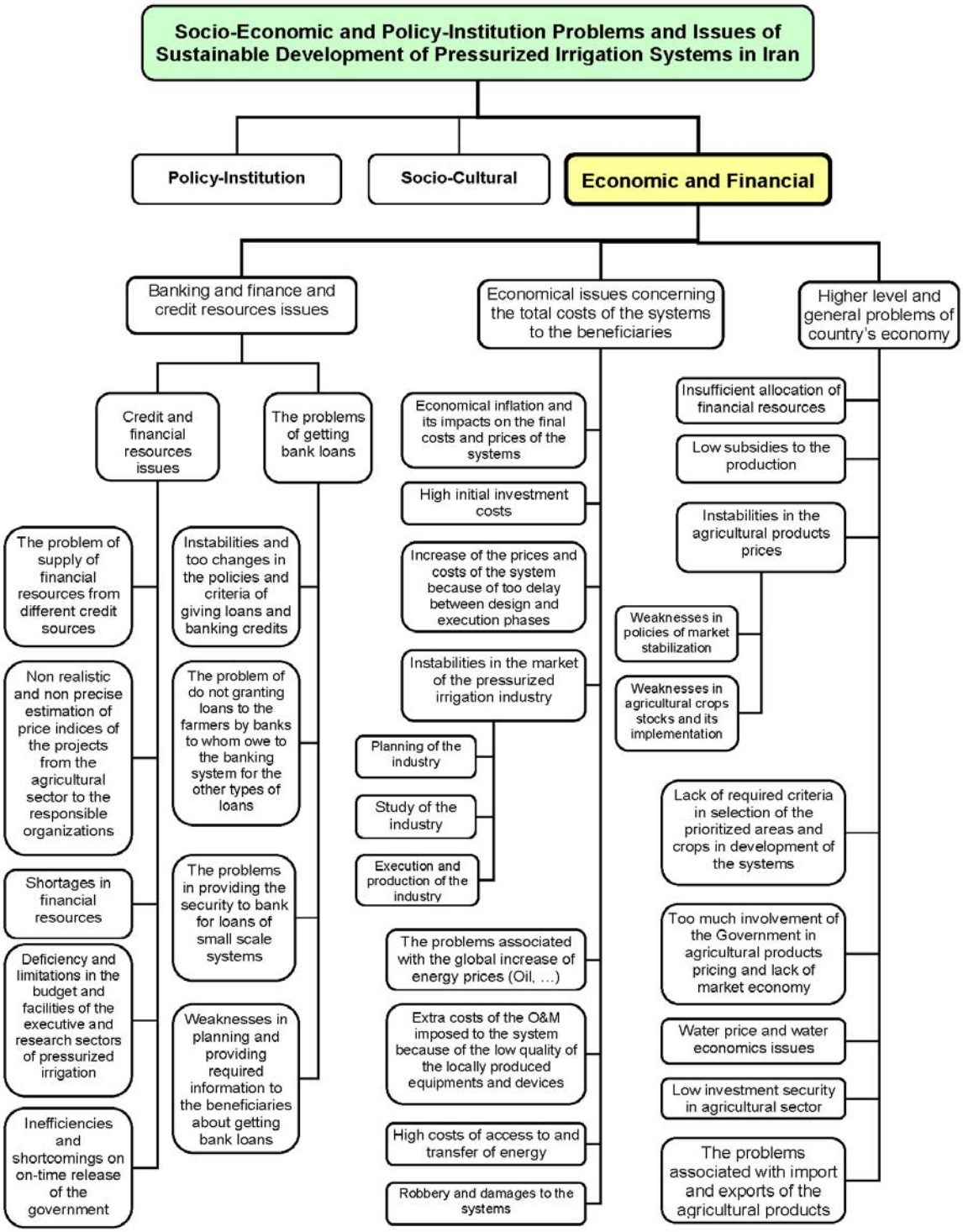

Figure. 1.a. The problem tree of sustainable development of pressurized irrigation systems in Iran (Branch of Economic-Finance issues) (L'arbre des problèmes de développement durable de l'irrigation sous pression (Direction des questions économiques Finances))

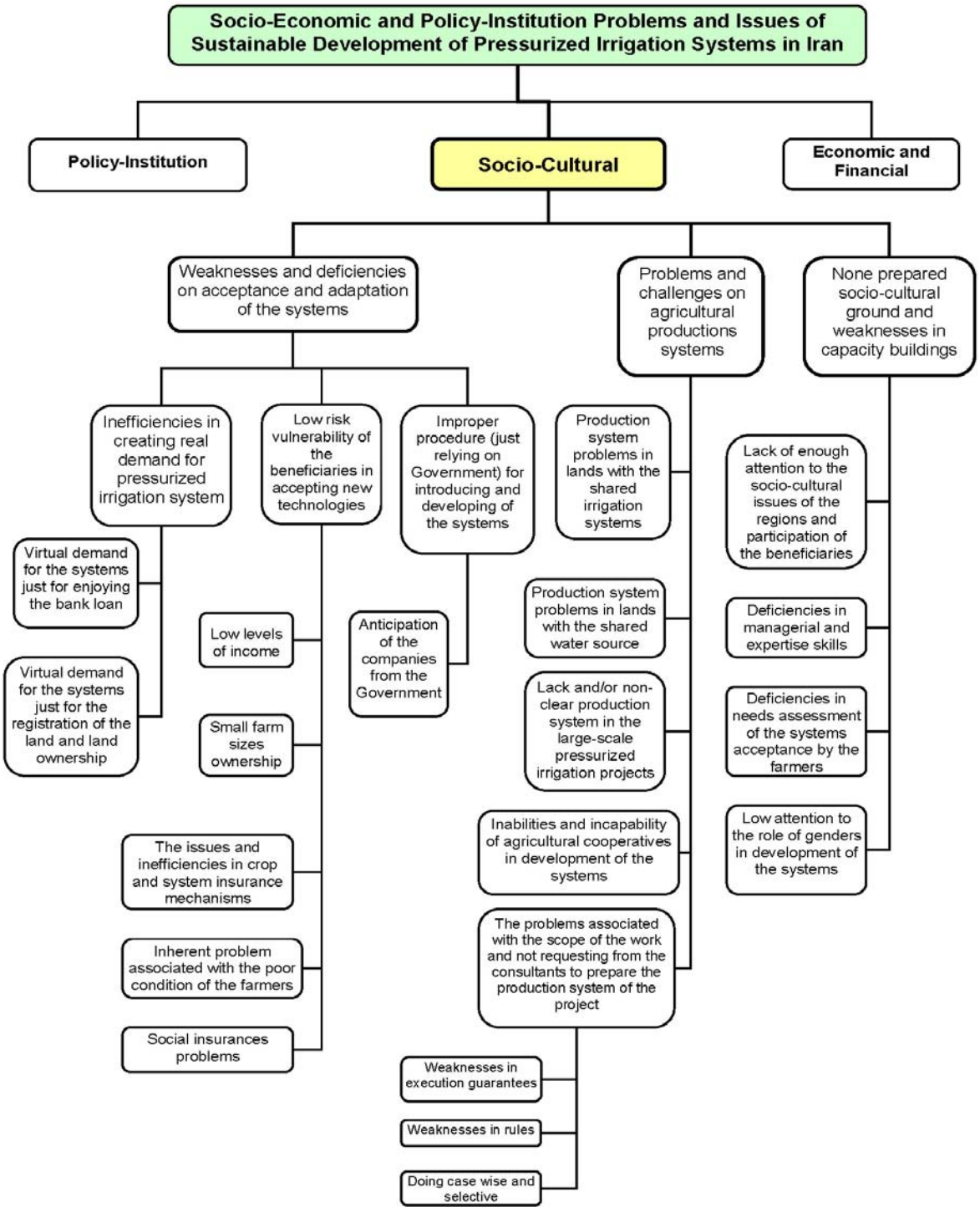

Figure. 1.b. The problem tree of sustainable development of pressurized irrigation systems in Iran (Branch of Socio-Cultural issues) (L'arbre des problèmes de développement durable de l'irrigation sous pression (Direction des questions socio-culturelles))

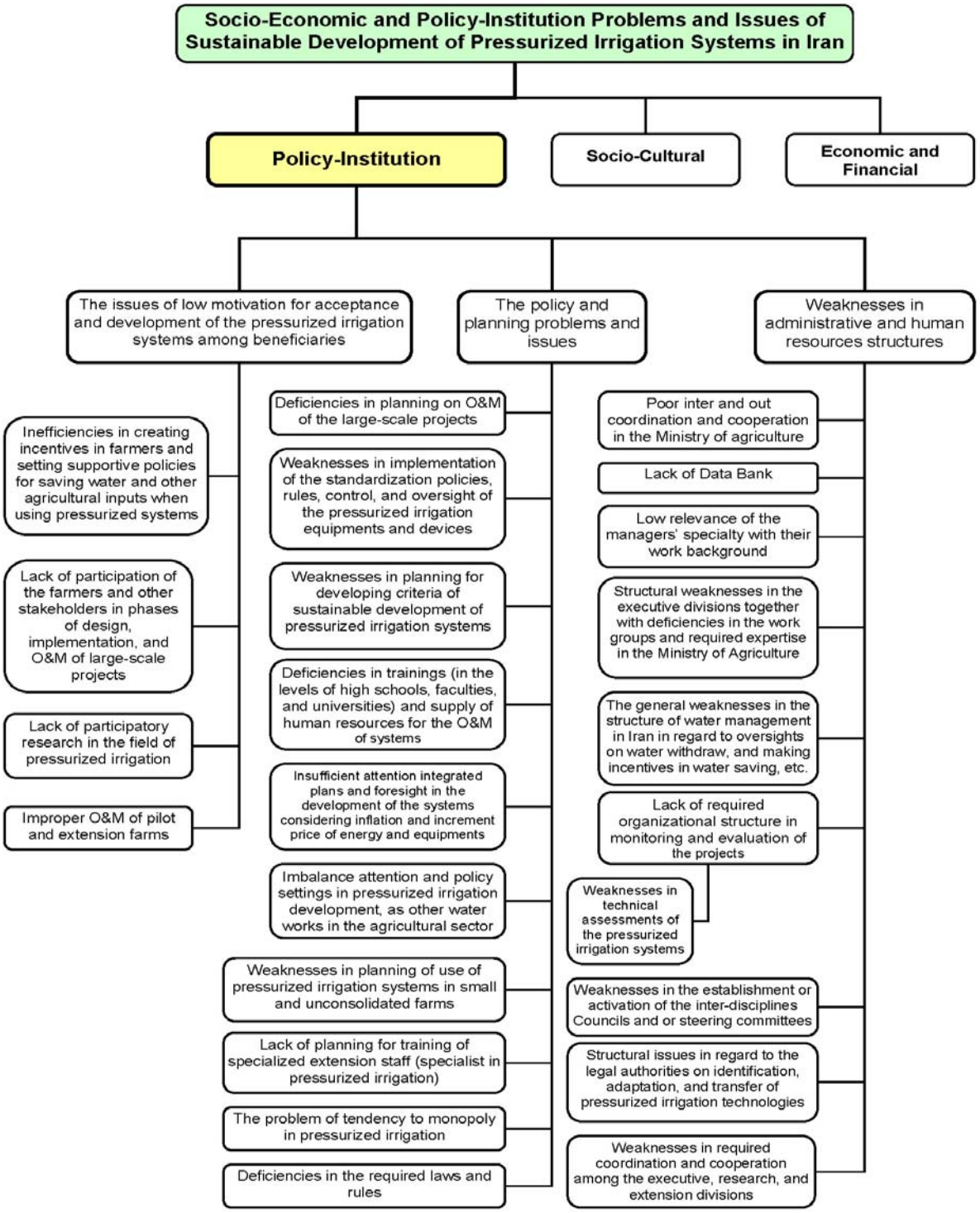

Figure. 1.c. The problem tree of sustainable development of pressurized irrigation systems in Iran (Branch of Policy-Institution issues) (L'arbre des problèmes de développement durable de l'irrigation sous pression (Direction des questions politiques de l'établissement))

Quantity basis, the identified problems were totally 88 cases, of which the economic-finance, socio-cultural, and policy-institution problems, included 39.8, 29.5, and 30.7 percent of total problems respectively. In table 2 the number of the identified problems for every branch of the problem tree is provided in detail.

Table 2. Number of the identified socio-economic and policy-institution problems hindering sustainable development of pressurized irrigation systems in Iran (Le nombre des problèmes identifiés politiques institution socio-économique et dans le développement durable des systèmes d'irrigation sous pression en Iran)

Branch/sub branch	**Number of identified problems**			**Sum of problems**	**Percent of total (%)**
	Economic and financial branch	Socio-Cultural branch	Policy-Institution Branch		
1st	3	3	3	9	10.2
2nd	18	12	23	53	60.3
3rd	14	11	1	26	29.5
Sum	35	26	27	88	100
Percent of total (%)	39.8	29.5	30.7	100	

It is evident that all the above listed problems have no similar importance and impacts on the progress of objectives. Therefore, the prioritized problems were also identified by participatory method. Two methods were used for this purpose. First, the rankings were made on each branches of the problem tree and the numbers 1, 2, … were assigned for the higher priorities in each branch respectively. In the trees provided in figures 1.a to 1.c, the boxes are arranged in these orders from top to bottom. In the second method, irrespective of the location of the problem on the tree, the problems were prioritized based on the four categories of importance, i.e. Very high (V), High (H), Moderate (M), and Low (L). In the followings results of prioritization of problems with the second method and just for the V category are provided in brief[1]:

- Economical high inflation rate and its impacts on the final costs and prices of the systems to the beneficiaries
- Production system problems in lands with the shared irrigation systems
- Poor inter/out coordination and cooperation in the Ministry of Agriculture
- Deficiencies in planning of O&M of the large-scale pressurized irrigation projects
- Insufficient attention to the integrated plans and foresight in the development of the systems considering inflation rate and increment price of energy and equipments
- Inefficiencies in creating incentives in farmers and setting supportive policies for saving water and other agricultural inputs for them when using pressurized systems
- Lack of participation of the farmers and other stakeholders in the phases of design, implementation, and O&M of large-scale pressurized irrigation projects

1 - Details of results are provided in the reference: (Heydari, 2010)

- Improper procedure (just relying on Government) for introducing and developing of the systems
- The problem of tendency to somehow monopoly in pressurized irrigation development
- Weaknesses in planning of use of pressurized irrigation systems in small and unconsolidated farms
- Insufficient participatory research projects in the field of pressurized irrigation

4. CONCLUSIONS

Results of this research indicated that the progress rate of sustainable development of pressurized irrigation systems in Iran is not considerable in regard to the total irrigated areas of the country. The reasons and main hindering factors could be categorized into different technical, technological, infrastructure, technology adaptation, and socio-economic and policy–institution kinds of problems and issues. However, the main socio-economic and policy-institution problems hindering sustainable development of pressurized irrigation systems in Iran could be categorized into the main categories of economic and finance, socio-cultural, and policy-institution problems.

Based on the identified prioritized problems and from the strategic aspects, results of this research also indicated that the following strategies should be implemented in the country for the sustainable development of pressurized irrigation systems from socio-economic and policy institutions aspects: 1) More involvement of the private sector in pressurized irrigation systems development and hence disengagement from the government 2) More attention to energy savings in the systems, considering growing demand of energy and energy prices increase to happen in near future 3) Selection of economic criteria in prioritizing development of pressurized irrigation systems in different regions, and 4) More focus of research studies and plans on measures for economic justification of using pressurized irrigation systems in small scale farming systems.

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