



RESEARCH ARTICLE

A New Financing Model for Carbon Emission Reduction Projects: The Use of Carbon Emission Reduction Purchase Agreements (ERPA) in the Private Pension System

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ABSTRACT

As a result of the awareness of global climate change, many studies have been carried out to avoid this situation. These studies have been carried out intensely since the protocol signed in Kyoto in 2005. Reduction of carbon dioxide emissions from engines operating on fossil fuels, the promotion of using the renewable natural sources such as wind, solar, etc. which are called clean energy, methane gas decompositions, and similar studies are some of these. As the studies increased, funding difficulties began to be seen in supporting the projects. In this context, especially project selection has started to gain importance. When the carbon emission reduction projects are examined, it is seen that forestry and especially forestation projects are very important. Especially, afforestation investments are very important in terms of increasing carbon sinks and many ecosystem services they provide are of great value. The aim of this study is to develop a new mechanism to create a source of financing for afforestation investments. In this context, the Private Pension System Funds was used as a fund-raising tool for the financing of afforestation investments. In this new mechanism, it was aimed that preventing climate change by making all actors gain income. With the implementation of this system, it is thought that the problems in the existing carbon markets will be prevented, the investments on afforestation will increase and also the environmental funds will become widespread.

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Introduction

It is very important to ensure the continuity of natural resources, which are the basic elements of sustainable living, in line with the principles of conservation-use. The cliché of humankind, understanding the loss of their possessions only when they lose them has also been observed in the process of realizing climate change. After the industrial revolution with the increasing carbon-based gas emissions and as a result of

the greenhouse effect caused by the increase in the ratio of these gases in the atmosphere, there has been a rapid change in the world climate. This phenomenon called Global Climate Change caused warming in some places and cooling in some places. Especially, these changes, which cause extreme and sudden climatic events, have caused various natural disasters.

As a result of the awareness of global climate change, many studies have been carried out to avoid this situation. As a result

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of international meetings and agreements, efforts to reduce carbon dioxide emission have been accelerated. In this context, it was decided to conduct a series of studies to reduce the rate of greenhouse gases in the atmosphere. These studies have been carried out intensely since the protocol signed in Kyoto in 2005. Reduction of carbon dioxide emissions from engines operating on fossil fuels, the promotion of using the renewable natural sources such as wind, solar, etc. which are called clean energy, methane gas decompositions, and similar studies are some of these.

Although there are many reasons for the formation of greenhouse gas, the necessity of forest protection has become more important, especially after the great damage caused by excessive human pressure and intensive use of the forests, which is the largest terrestrial ecosystem that keeps these gases. In this context, there are still many things to achieve to protect and take care of the forests despite the efforts put forth so far. In addition to the studies carried out in different sectors and especially in the energy sector, various studies are carried out in the forestry sector in order to reduce the carbon-based gases in the atmosphere and these works are generally aimed at creating carbon sink and increasing the amount of it. The most important studies in this context are REDD+ and LULUCF programs. Whereas REDD+ (Reducing Emissions from Deforestation and Forest Degradation) tries to reduce carbon emissions from deforestation and forest degradation (UNDP, 2015), LULUCF (Land Use, Land Use Change and Forestry) tries to determine changes in carbon footprint due to changes in land use and greenhouse and g their effects on emissions (UN, 2015).

It is seen that some of these studies are based on economic considerations. One of these is the so-called carbon finance, which is focused on reducing greenhouse gas emissions. This method is briefly defined as providing funding for a project to purchase carbon. (The National Experience of Carbon Markets, 2011).

In the framework of the studies carried out for the purpose of reducing greenhouse gases, although carbon financing is obtained for the projects carried out on many different subjects, it doesn't seem that potential value of forestry projects is fully realized, but in recent years an increase has been observed. 17% of gas emissions result from deforestation and forest degradation according to the Intergovernmental Panel on Climate Change. Although this amount is higher than the emissions from the entire transportation sector, the reduction of carbon dioxide emissions of automobiles seems more popular and important.

When the causes of greenhouse gas emissions are analyzed, it is seen that the amount of emission due to the forest destruction comes second after the energy sector. In this context, the role of reclamation and expanding of forests is very important in greenhouse gas emissions. Forests have four main roles in climate change. Forests are carbon sinks along with the forest soil and forest products. Sustainable forest management removes more CO₂ from the atmosphere. Forests are a source of clean energy alternative to fossil fuels. Forest destruction leads to an increase in emissions (ASAN, 2010).

In addition to the contributions of forests to the climate, there are many different service and products offered to the ecosystem as well. Although wood-based products are the most widely known, non-wood products and services are more useful by both quantity and benefit than wood-based products.

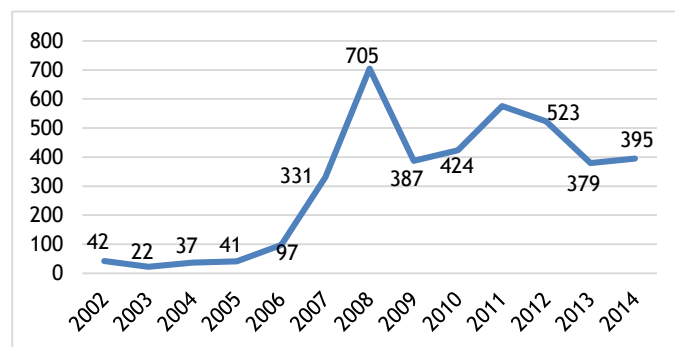


Figure 1. The total value of the voluntary carbon markets figure

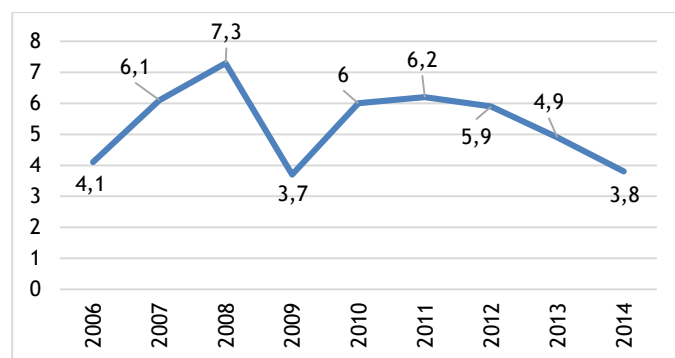


Figure 2. Average price of carbon credits being traded in the voluntary carbon market (\$/Tons)

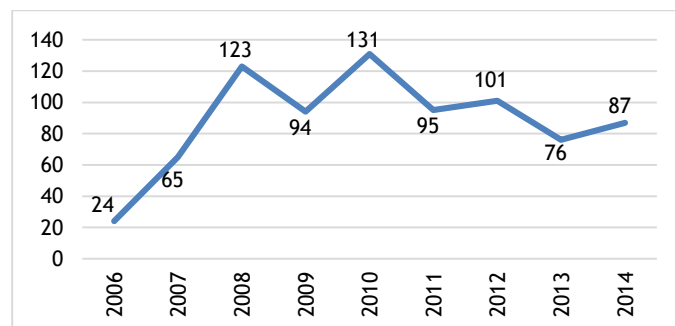


Figure 3. Traded on Voluntary Carbon Markets carbon volume (Million tons of CO₂)

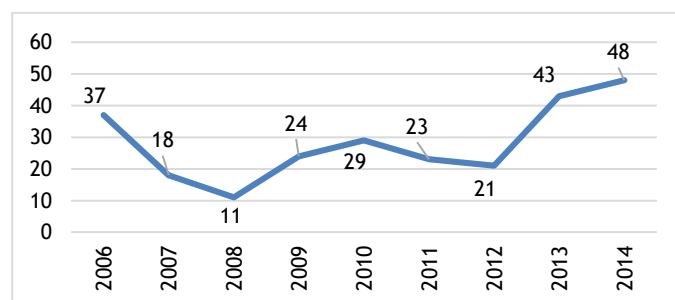


Figure 4. In the Voluntary Carbon Markets, the importance of forestry projects (%)

Forests, with wood and non-wood forest products, are a must for the economy and they are one of the main pillars of sustainable development, and these products and services are among the wheels of the economy. Services such as recreation, clean drinking water production, hunting animal provision etc. are some of them. In the last decade, they have entered the carbon market within the framework of the carbon sink feature in greenhouse gas reduction studies based on economic considerations. Figure 1, 2, 3, and 4 indicates the process in the voluntary carbon market and the status of the forestry projects (Hamilton and et al., 2007; Hamilton and et al., 2008; Hamilton et al., 2009; Hamilton et al., 2010; Peters-Stanley and et al., 2011; Peters-Stanley and vd., 2012; Peters-Stanley and et al., 2013; Peters-Stanley and vd., 2014; Hamrick and Goldstein, 2015).

Increasing the number of projects in the forestry sector developing them and increasing the share of financing allocated to these projects are more important than other projects due to the diversity of outputs and characteristics of forestry projects. Forestry sector projects to be performed in order to reduce greenhouse gas are of great importance in two aspects. First of all, the forests have a high percentage of carbon capture for many years through their above-ground, litter and subsoil structures, then with the use of particularly wood-based materials, it can preserve carbon in its structure for many years. The second is that these projects will also help to increase and preserve forested lands and provide many products and services as well as carbon capture.

As in all other areas, the most important problem in projects intended to reduce carbon emission is to get funding. In particular, the problem of getting funding in the voluntary carbon market including Turkey is felt even more. In addition to the support provided by the private sector companies to reduce their carbon emissions, it remains limited to get funding for projects to reduce carbon emissions. Therefore, the main question to be answered is how the funds circulating in the investment market can be directed to forestry projects.

In this study, "Private Pension Funds" as a new financing source that can be used in afforestation projects which are considered important in reducing greenhouse gas emissions and the usability of "Carbon Bonds" as a new tool in the portfolio of these funds are discussed. The study was exemplified in the scale of Turkey, were discussed and evaluated.

Why Afforestation Projects?

Turkey's surface area is about 78 million hectares (OGM, 2014). When the area of the stream and lakes of (1 million ha.) is taken out from this area, the area of 77 million ha. remains and when high mountainous areas (areas over 1500m) is taken out, an area of 55.6 million ha. remains. In addition, when arable lands of 26,5 million ha. with land capability classifications I, II, III and IV (Anonymous, 2014) and other forested lands (17.5 million ha.) are taken out (Haktanır et al., 2000, Anonymous, 2014) the amount of lands available for carbon reduction projects is approximately 11.6 million ha. In this context, it is seen that there is great potential for

afforestation activities within the scope of both forestation of non-forest areas and improvement of degraded forest areas.

Due to the high potential availability of the lands to be afforested together with the fact that the afforestation projects produce many outputs of different types and economic characteristics, for carbon bonds applications afforestation investment projects within the forestry sector have been selected as implementation projects. In this context, the fact that the labor-intensive industry is high in Turkey because of its geographical features emerges as a factor in strengthening the social dimension of these studies.

However, another important point here is the selection of species to be used in afforestation. Industrial afforestation to be conducted with species that are growing fast and with shorter management time plantation works to be performed with tree species relevant to target diameter with longer time period? The answer to this question will lead to differences in contributing these investments to the economy and will lead to the use of different ways of transferring the revenues obtained to the market. Since the fast-growing species requires special areas and favorable climatic conditions and needs to be raised in areas with low slope and not too high above sea level and as the ultimate goal is to reduce greenhouse gas emissions expanding carbon sinks, the plantations in the industrial plantation forestry were excluded.

Why Private Pension System?

Today, one of the most effective methods used to fund investments is to create funds. The funds collected by investment companies and banks from individuals or corporate customers are combined into the funds created and invested. In private pension systems, money is collected in the same way and it turns into investment through funds. In recent years, the imbalance in the financial structure of the Social Security Institution and the increase in the debt ratios have brought into question supporting individual pension by the state. In this context, in addition to the money invested, putting into practice the state contribution of 25% of this invested money led to the growth of the private pension funds both in quantity and in popularity. According to April 2015 data, the size of private pension funds reached 40.3 billion TL with 5.3 million participants. In the 2015 election manifesto of the current government, the reduction of individual pension cut-off rates and the introduction of automatic participation in individual pension system can be shown as a proof that this system will grow even more in the following years.

What is a Private Pension System?

The private pension system was established to increase the savings of individuals for retirement and to provide additional income for their golden years. The private pension is a premium-based system managed by the private sector. Private pension can be considered as retirement insurance, based on the assessment of the financial contributions that employees regularly invest in their personal accounts depending on a predefined contract.

Retirement funds benefit from many financial assets in respect of their structure. Social security systems are the cornerstones of a country. The problems experienced in these foundation stones do not only affect individuals, but also lead to an increase in interest rates in the economies where individuals live, and thus, the slowdown in the accumulation of capital and the economic slowdown and welfare loss. When we look at many developed countries, it is obvious that carrying out private pension funds through companies with their investor characteristics as well indicates that they are a source of hot money flow for the markets. With these characteristics, private pension funds can be seen as a means of eliminating the problems that may arise in financial systems. When we look at the industrialized countries, it is obvious that the balance of working and non-working age is getting worse. To prevent this deterioration, while the young population contributes to production, they at the same time invest in private pension funds to make them comfortable and prosperous during their retirement period. When we look at the individual pension systems, we see that private pension systems have emerged with the collapse of the old pension systems. Especially the financial crises experienced in the last 10 years and the decrease in the life welfare of people together caused loss of income. Citizens or individuals who have lost their income want to contribute to the economy together with the private pension system and to live a comfortable life. In addition to the innovations made in September 1999 through the regulations made in the Law No. 5510, the private pension system aims to establish an individual pension system that will increase the savings for the elderly, to restructure the health services in a more efficient way and to establish a comprehensive social assistance system. For this purpose, the private pension savings and investment system law was implemented on October 7, 2001, and the individual pension program was completed in order to complement the pension plans in the social security system for the first time in our country. It is possible to summarize the basic elements of the individual pension system as follows.

- The system is fully voluntary
- Is open to everyone who has the right to use civil rights
- It is also open to employees in public or private organizations together with not working people and retired ones.
- It is possible for employers to be included in the system as a legal entity when they want to contribute to their employees.
- The system also allows anyone who participates in the system and who is an insured person to monitor their investments and the dividend shares from these investments in their own accounts.

Thus, the main purpose of the individual pension is not to replace the existing pension systems. It is to provide complementary effects on the peace and prosperity of individuals or system participants.

Overall Process of Private Pension System

The process starts with the individual account opening in pension companies in order to benefit from a private pension. Employers can contribute voluntarily to the accounts. The company that manages the retirement accounts will operate exclusively in the pension system market with all its legal personality characteristics having a complete specialization and competitive advantage. Companies that currently carry out insurance activities and who have fulfilled the requirements related to the corporate activities in the law can turn into a pension company whenever they wish. Companies that wish to continue their activities as pension companies will create different mutual funds according to different risk alternatives. The management of these funds will be carried out by portfolio management companies. While the funds will be monitored and supervised by the private pension company and the portfolio consultancy company, they will be under the supervision and control of the state. Individuals participating in the insurance system will be able to receive risk cover. In addition, they will be able to diversify across different fund alternatives in a way to reduce their risks without abiding by any investment fund and also have the right to make a transfer to another pension company within a certain period. When the age limit stated in the contract is reached, the contributions shall be repaid together with the dividend shares, whether as bulk or in monthly installments. There may be differences in applications such as tax-deduction, as there may be early departures from the pension system without waiting for the end of the contract.

Process of Individual Pension Savings and Investment System

Participation in private pension system

Persons who have the right to use civil rights can participate in the private pension system. People participating in the system must sign a contract with a private pension company.

Individuals who are over the age of 18 years can participate in the private pension system. After determining the pension companies with their own free will, the participants sign the pension contract of the company. After this stage, preparing the best-suited retirement plan, the company presents the participants these plans. After the dividend shares are decided, signatures shall be taken, and the pension contract shall be initiated upon the payment of the first contribution. The Pension Contract is mainly composed of the participant and the company covering the principles regarding involving of the participants in the system, retiring or jumping out of the system, payment of the contributions, monitoring of these contributions in the private pension accounts, the investments in the funds, principles concerning the payments to the participants or beneficiaries and regulating other rights and obligations of the parties.

The financing of the private pension system

Funding in the private pension system consists of the contribution fees and entry fees together with other deductions requested from the participants. The costs and deductions received from the participants during the individual pension contracts are shown in the diagram below. (Figure 5)

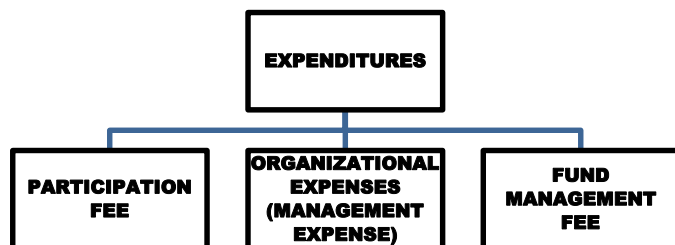


Figure 5. The costs of PPS participants

Pension company may receive entry fees from the participants or people acting on behalf of the participants in case of joining the private pension system for the first time or opening a new private pension account, provided that it does not exceed the monthly amount of the minimum wage valid on the date of signing the pension contract. The pension company may deduct an administrative expenses fee not exceeding the rate of maximum eight percent of the contribution of the participant to the individual pension account and a fund management fee calculated on the basis of the net asset value at a rate of maximum one hundred thousand to ten percent. Companies are obliged to clearly show any deductions from individual pension accounts in the pension contracts and announcements. In order to make changes in the entry fee, administrative expenses fee and fund management fee included in the pension contracts, it is essential that there is no contrary provision in the contract and that the change is approved by the Undersecretariat.

The participant contributes to the individual pension account to be opened in the company in accordance with the principles specified in the individual pension contract; he may decide on the allocation of the contribution share among multiple funds of the same company and the change of pension plan within the framework of the conditions in the pension contract and request the transfer of their savings in the individual pension account to another pension company. In order to request to be transferred to another company, the participant must be at least one-year member of the company. In this case, the company is obliged to fulfill the request within seven business days from the notification and transfer the information and documents related to this account together with the holdings. The participant may change the pension plans or the distribution of the contribution fees to the funds at most four times a year. The participant may stop paying contributions to the private pension system before qualifying for retirement. Within the term of retirement contract, the participant may withdraw from the private pension system requesting his holdings at any time or in case of permanent disability. In case the participant requests a withdrawal, the holdings in the individual retirement account are paid

according to the provisions of the pension contract. Participants have the right to choose between the same company's products.

Overview of funds available

Private pension mutual funds enable us to protect our holdings from the corrosive effect of inflation, to gain profit in line with interest rates in the money markets and to benefit from the possible opportunities of market trends.

If we look at the existing funds in general, investments can be made in government bonds and short-term treasury bonds. Savings at short-term treasury bonds or government bonds are protected from corrosive effects of inflation. Their return percentage is at a similar rate of Stock Exchange İstanbul interest rates. The money market makes use of the opportunity gains generated by interest movements and achieves high-profit targets without high fluctuation. Investors seeking to invest in long-term treasury bonds or government bonds benefit from medium and long-term treasury bonds and government bond returns. These types of funds ensure that savings are protected from the long-term corrosive effect of inflation, creating regular and continuous income flows in the future. Investors who want to diversify their investment tools in stock funds, which are riskier, keep their portfolios in balance by investing in different investment tools. The investor, who wants to take the fund return rate to a reasonable and stable level, can invest in stock funds and get riskier but high-yield returns. Those who prefer exchange funds benefit from returns in foreign currency or exchange-indexed government borrowing tools. From a medium and long-term perspective; from foreign exchange, they try to get regular and continuous income flow in the future. It constitutes an alternative for investors who do not want to bear exchange and country risk. This type of funding can turn the real return of foreign stock and debt instruments in foreign currency into fund revenue. Apart from these, investors can invest in precious metal funds. Precious metals funds can be financed through gold and gold-based capital market instruments. In standard funds, investors who do not want to take a high risk may also have a balanced investment.

Methodology from PPS'S to ERPA'S

The Carbon Trading Agreement is a contract between the buyer and the buyer of the carbon emission rights (ER). ERPA provides a written legal framework that regulates the acquisition, sale, acquisition, and transfer of Carbon Emissions rights. The purpose of ERPAs consists of four elements: the creation of a contract by writing the provisions between the parties, determination of responsibilities, identification of rights and risk management. The parties of ERPA are buyers and sellers. The buyer receives emission reductions from the project and pays for the reduction. Thereafter, initial and periodic verification, verification and certification operations are carried out. Finally, emission reductions are delegated. Parties, definitions, sale and purchase related articles, delivery, documents or other evidence proving the validity of the ERs, articles related to the basic evaluation, articles related to risk management, contract price and payment

terms, declarations and commitments, responsibilities and indemnities, delinquency, rescission and legal solutions, progress reports and auditor's rights, privacy statement, provisions relating to the settlement of arbitration and disputes, taxes, duties and fees, force majeure and articles relating to third parties and other matters matters should be included in Carbon Emission Reduction Contracts. The four types of contracts can be arranged in the form of ERPAS: futures contracts, spot contract, option contract or a mixed contract (Cob. gov. tr. Access date: 19.10.2015)

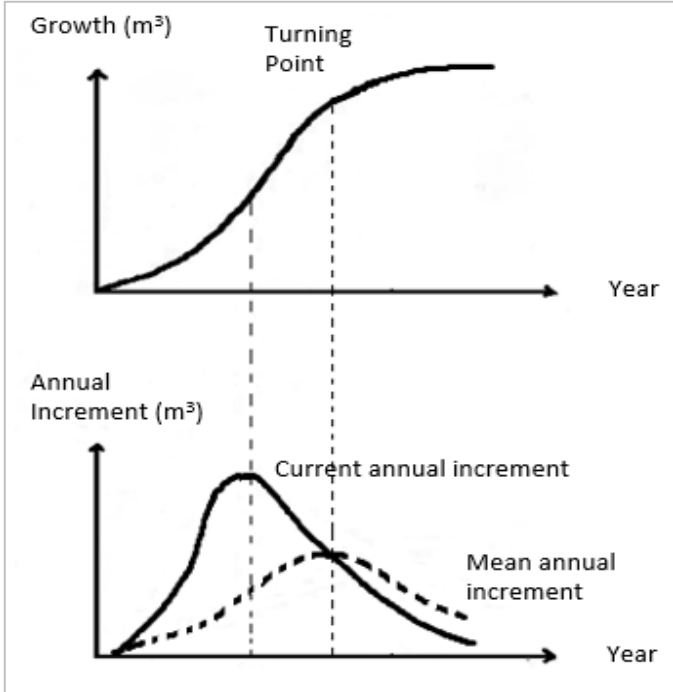


Figure 6. Single-tree volume-age and increment-age graph (Saraçoğlu, 2002)

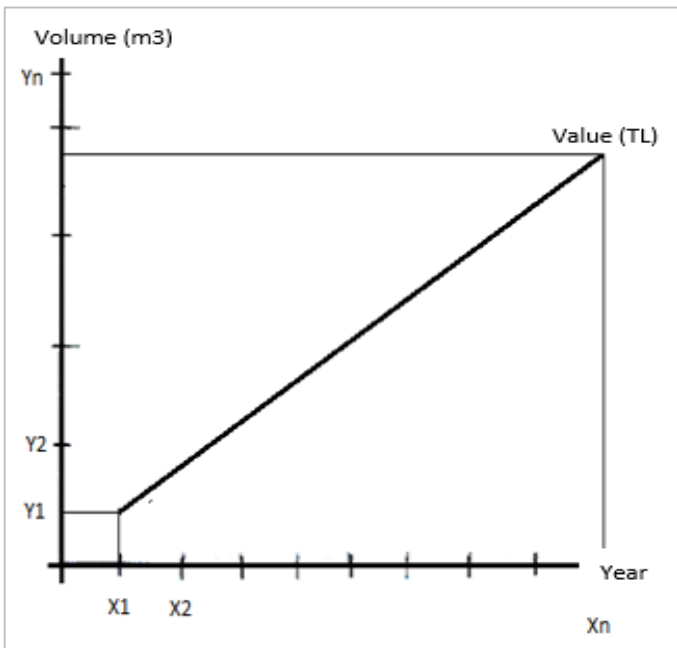


Figure 7. Bond value change chart

In this context, it is foreseen to make use of the carbon accumulation from the afforestation projects and to use bonds as instruments to be used in private pension funds. This is because the bonds and a tree or forest have the same overall structure (Figs. 6 and 7).

Bonds are debt instruments issued by corporations, state or public institutions with the same parity and nominal values in order to provide medium- and long-term debt. While bonds issued by corporations are subject to Turkey Commercial Code provisions, those issued by public agencies and state are subject to special laws in Turkey. Corporations can meet their cash needs in various ways. One of them is a capital increase, that is, taking new partners to the enterprise by issuing shares and the other is borrowing. Companies can also obtain the loans they need by either borrowing from banks or issuing bonds to a public offering. Both bonds and stocks are investment instruments bought and sold at the Stock Exchange Markets. However, there are some fundamental differences between them. Bonds are debentures and do not give ownership to the company. They are usually limited to a specific term and provide a bearer with interest income during this period. However, stocks are instruments that represent ownership over the enterprise (ensuing partnership), which do not have a certain payback period. They do not bring in a fixed income, such as interest rate. However, they give the right to share the profits. The capital of the bonds can be paid when due or reimbursed before the due date if its number comes out of draws being performed according to a redemption plan. A premium can be paid to the bonds remaining in circulation until the due date in the redemption plan or to the bonds winning the draw when the due date is close taking into account the length of time. Bonds may be issued by name or bearer. Bonds can be sold at the price written on the bill, or at a price above or below this price (Issued Value). There is an inverse correlation between the selling price of a bond and the true interest rate it provides. For example, if a bond with a nominal value of TL 1,000 (the written price), which has an interest rate of 8%, is marketed at a price of TL 800, the true interest rate is 10%. Corporations can issue bonds of various types. For example, premium, bonus, profit participation, collateralized, stock exchange and interest rate adjustable bonds are some of them (What is Bond? Access Date 10.08.2015).

The process of the system will be as follows (Figure 8). Afforestation investments to be conducted by individual or legal persons are approved by independent certification institutions and the main framework in the system is directing the money source collected in PPS to forestry investments. For this purpose, it is necessary to establish a fund in the name of an environmental fund/climate change fund/carbon reduction fund.

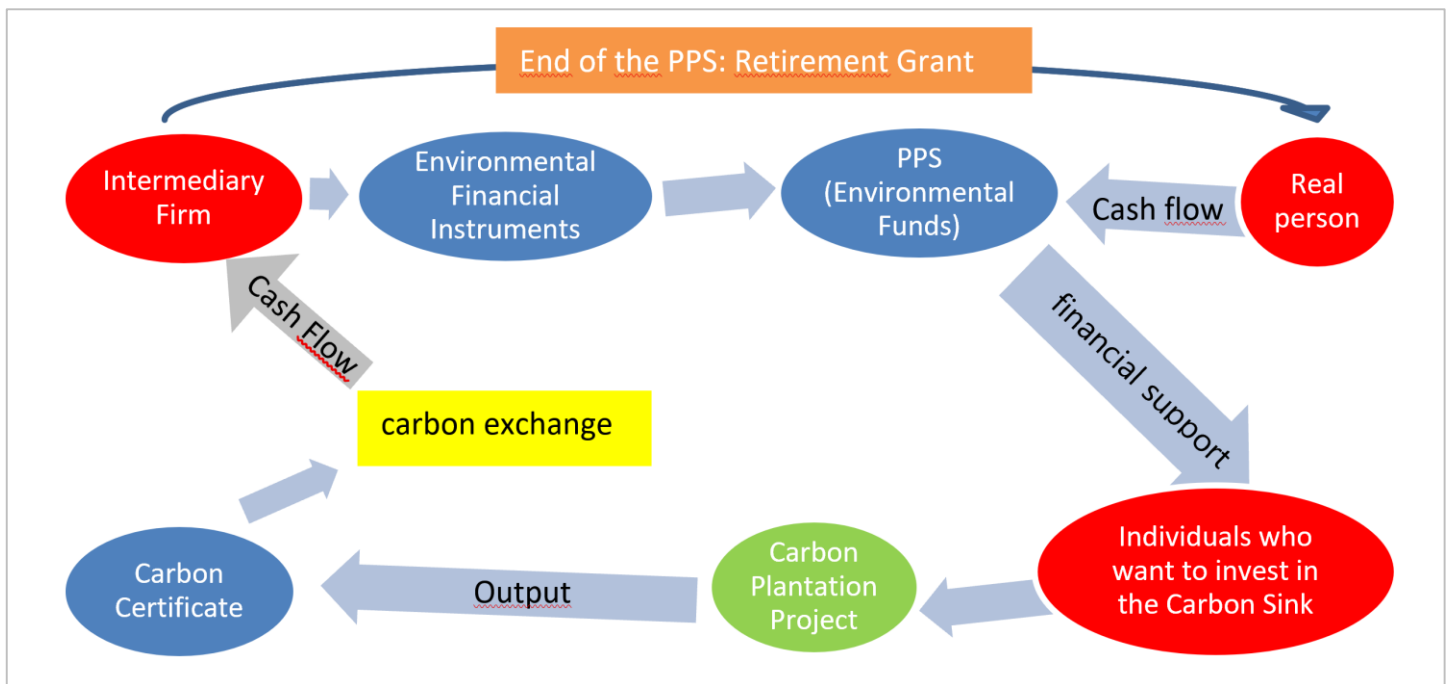


Figure 8. New financing method based on PPS for carbon sink projects

In this respect, the Real or Legal Person X considers the Private Pension System as a financier tool regarding the expansion of the Forests and in this regard, it deems an ER loan for the wooded areas, which are subject to emission, he will create or previously-created which is considered as a corporate bond.

For this purpose, X applies at the intermediary firm for evaluating the ERPAs. The intermediary firm calculates the costing for the real/legal X. There are basically two types of costs. First, the costs of afforestation, and second, the costs of carbon credit. A project for the area to be created for carbon emission is required and this project can be provided by the intermediaries to X. By independent institutions where intermediary institutions and ERPAs will be considered, Real /legal X person has been issued an investment vehicle, and undertakes to open new sink areas with a certain percentage of the revenues to be obtained by the agreement.

X, whose project has been accepted, ERPAs are audited and became the actor of the forestry, is supported by the portfolio which has investment tools, and is being included in the Private Pension System. Additional tax incentives may be offered if individuals are included in the system and invest in portfolios of financial instruments created from afforestation projects and they may have the possibility of granting more state contributions to citizens' sensibility.

It may be one of the advantages of this system to further embody an abstract concept financing it, such as the creation of state credit through a special afforestation law (which may also be in the form of a bond / treasury bill), drawing the attention of individuals, the creation of public opinion and a more liveable environment.

In this context, if the issue is broadened, the main objectives for forest villagers should be increased forestation

and reforestation, preventing deforestation; and more restoration of the deteriorated agricultural lands and meadows/pastures.

Discussion

The efforts to prevent climate change have reached the present day following the Rio Earth Summit in 1992, based on the emerging sustainable resource management. In this period, many different methods and projects have been conducted. The most important point in these studies is the determination of the financing sources to be used for the projects. No matter how much it is a beneficial project because it cannot be conducted unless it is provided with sufficient financing.

Many different financing methods have been used for afforestation efforts. These afforestation works, although not directly for the purpose of carbon accumulation, are similar in terms of being a forestation project. As reported by Koçar (1999), afforestation studies have been granted credit by the Farmers' Chamber for 40 years with 5% interest since 1936 in the United States. Tax incentives are also provided. In Spain, up to fifty percent of the afforestation investments are donated according to the law, and up to 90 percent of the total cost can be granted credit. In Portugal, up to 70% of financial aid can be provided from the budget and funding created for the development of forestry in the private sector. The Forestry Authority Forestry Commission, an official institution for afforestation efforts in the UK, awards a grant up to 70% during planting and in 5 years awards a grant for the rest. In Australia, 40-50% of the cost of afforestation investments for different types of trees can be subsidized by the forest organization, but these supports are not sufficient. In Australia, the private sector covers costs such as the guarantee of purchase for forestation, silvicultural support, rejuvenation costs. Forestry efforts in the Netherlands are provided by the Ministry of

Agriculture and Fisheries as tax reductions and direct grants. The National Forestry Fund established in Argentina supports forestry projects and in Chile, it is stated that 50% income tax reduction is provided by law in forestry efforts (Koçar, 1999). As afforestation efforts are covered by the forestry organization in Turkey, financing is provided by institutions and treasury. On the other hand, forestry and treasury lands are allocated to private afforestation investments and low-interest loans with government support are provided.

All of the aforementioned economic stimulus and supports are mostly state-funded financial resources. These resources may be interrupted by crises that may occur or changes in the main objectives and investment priorities of the state institutions. For this reason, it is essential to develop financial resources and integrate investments of real persons and the private sector into the forestry sector. By this way, it will be possible for the savings of institutions and individuals to turn them into an investment and to contribute to the environmental protection efforts together with reducing the carbon emission rates of the country by reducing the carbon emissions as well. In this context, the integration of afforestation investments to PPS system through special bonds in order to increase carbon capture will ensure that investors and entrepreneurs are guaranteed by laws and regulations.

Bonds, stocks, etc. have been proposed for vehicles as a financing tool poplar plantations in Turkey (Koçar, 1999). However, it is stated that there is no possibility of financing with current bond transactions. For the afforestation investments, it is stated that it may be possible to use the coupon bond or stock exchange with exchangeable bonds and the necessity of legal regulations is mentioned. The proposed bond in the proposed system is proposed as a main framework. In the detailed system to be formed within this scope, a new structure should be prepared with various arrangements by considering the structure of the bond which is similar to the growth of a tree in general. In this context, it will be possible to use the carbon credits obtained from the afforestation investments of the intermediary institutions such as banks during the determined bond period. In addition, the increasing carbon ratios in the afforestation areas each year represent an increasing value in the carbon market. On the basis of the PPF, this will also prevent the issuers of the bond issuers on an annual basis, thus avoiding the pressure of cash outflows on an annual basis. At the same time, the intermediary institutions will be able to evaluate the revenues from the sale of carbon credits due to the long term.

It is obvious that carbon emission contracts included in private pension funds may have some macroeconomic effects. These can be expressed as:

- Contributing to society with a more livable environment with the increase in wealth levels of individuals with additional income in retirement,
- Use of long-term fund accumulation as a financial tool to reduce greenhouse gas emission in increasing carbon sink areas,

- With the increasing ability of public and private sector to borrow, allocating more resources by the public sector to the efforts that will create environmental awareness,
- When allocating resources for employment-increasing investments, more resources can be allocated to sectors related to afforestation and forest efforts,
- Paving the way for the investors financially, who wish to carry out efforts to reduce the carbon emission, to carry out afforestation efforts through the extension of the term in the financial market,
- As environmental factors begin to improve, real and legal persons want to allocate more resources to this subject and deepening of money and capital markets,
- To contribute to sustainable growth and fight against inflation together with forestry efforts.

It is also considered that there are possible financial opportunities and expectations for the creation of carbon contracts in private pension funds. These can be expressed as:

- The return of funds that provide hedging against the aging of the population as environmental protection to the young population,
- Monitoring contributions to forestry on the basis of individual accounts in the use of long-term savings,
- Establishment of the severance pay fund for the employees in the forest sector by utilizing the infrastructure of the private pension system,
- In particular, laying out a little more risky products with less return softening the life insurances which offers risk-weighted products.
- A more competitive and dynamic market structure developing along with the rapid access of forest products to the end user with the widespread use of fast-growing species in forestry,
- Increasing the tax incentives to real or legal persons who consider carbon emissions as a threat and who spend funds to reduce impacts in this way,
- Strengthening the legislation and institutional structure of private pension in a way more sensitive to the environment

Conclusion

With the reduction of a number of scientific risks in climate change, the creation of forest sinks has recently become the focus of world science, priorities that require harmonious forestry efforts have been identified as an environmental area. When we look at the international policies on climate change, it is known that carbon sink areas, in other words, the forest carbon captures, are the easiest and cheapest way to reduce carbon emissions.

First of all, forests play an invaluable and critical role in climate change as well as in reducing carbon emissions as the largest carbon sink and the most important source of emissions. Trees are considered to be carbon concentrators.

Especially deforestation affects the total global greenhouse gas emission rates per year significantly. It is important to control and prevent deforestation. The use of forests as a carbon sink is often pushed aside when creating an emission pool. With regard to policies on the side of forestry, it is an irony. In order to prevent the global temperatures from rising rapidly on the average, it is being tried to give war on other fronts instead of the "Forestry Front." The benefits of global carbon markets as a means of combating climate change should be recognized in the forestry sector. As forestry and forest areas are becoming an international policy, forestation and the creation of carbon sink areas will become more supported.

Institutions or individuals need to take urgent action to raise awareness about carbon emissions. To this end, the impact on the international financial sector should also be reviewed when making emission reduction agreements. In order to reduce carbon emissions, it is natural for decision makers to want to see their returns in advance. Therefore, this type of market needs to be formed urgently. As mentioned briefly in this study, the evaluation of carbon certificates in a separate market by private pension firms would be a very appropriate decision. The diversity in financial markets will increase with the evaluation of hybrid financial instruments produced with carbon certificates in the capital markets. Individuals who want to be environmentally conscious should be directed to these types of financial instruments when creating their individual retirement portfolios.

As Turkey does not take part in the mandatory carbon market, to impose any sanctions on carbon emission reduction is beside the point. The carbon emission reduction projects based on volunteerism and the creation of the targeted carbon exchange are considered to be somewhat impossible. However, this reduction is more realistic and easy to implement within the framework of yielding economic profit investments. In particular, the existence of some features to prevent the exit from the system for at least 10 years increases the acceptability of the lower income at the beginning. Moreover, it is thought that the idea of investing in the future will be more accepted by people by helping people to reduce climate change.

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