



THE BIOMASS OF CONIFEROUS PLANT SPECIES AS A BIOENERGY RESOURCE – MINI REVIEW

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ABSTRACT

The usage of biomass from coniferous species is one of the most sustainable methods for using renewable energy sources. Forest wood or biomass from the essential oil industry can be used as an alternative energy source. The conversion of biomass into an energy source includes mainly thermal methods (pyrolysis, gasification, combustion). Coniferous biomass can be transformed into extrudates, pellets, or composite in the form of solid fuels during conversion methods. The application of the techniques of the circular economy through the use of coniferous biomass will contribute to the ecological and socio-economic indicators of Bulgaria. This review may focus on the potential applications of biomass from the logging, wood processing, and essential oil industries, and mainly in the use of coniferous species..

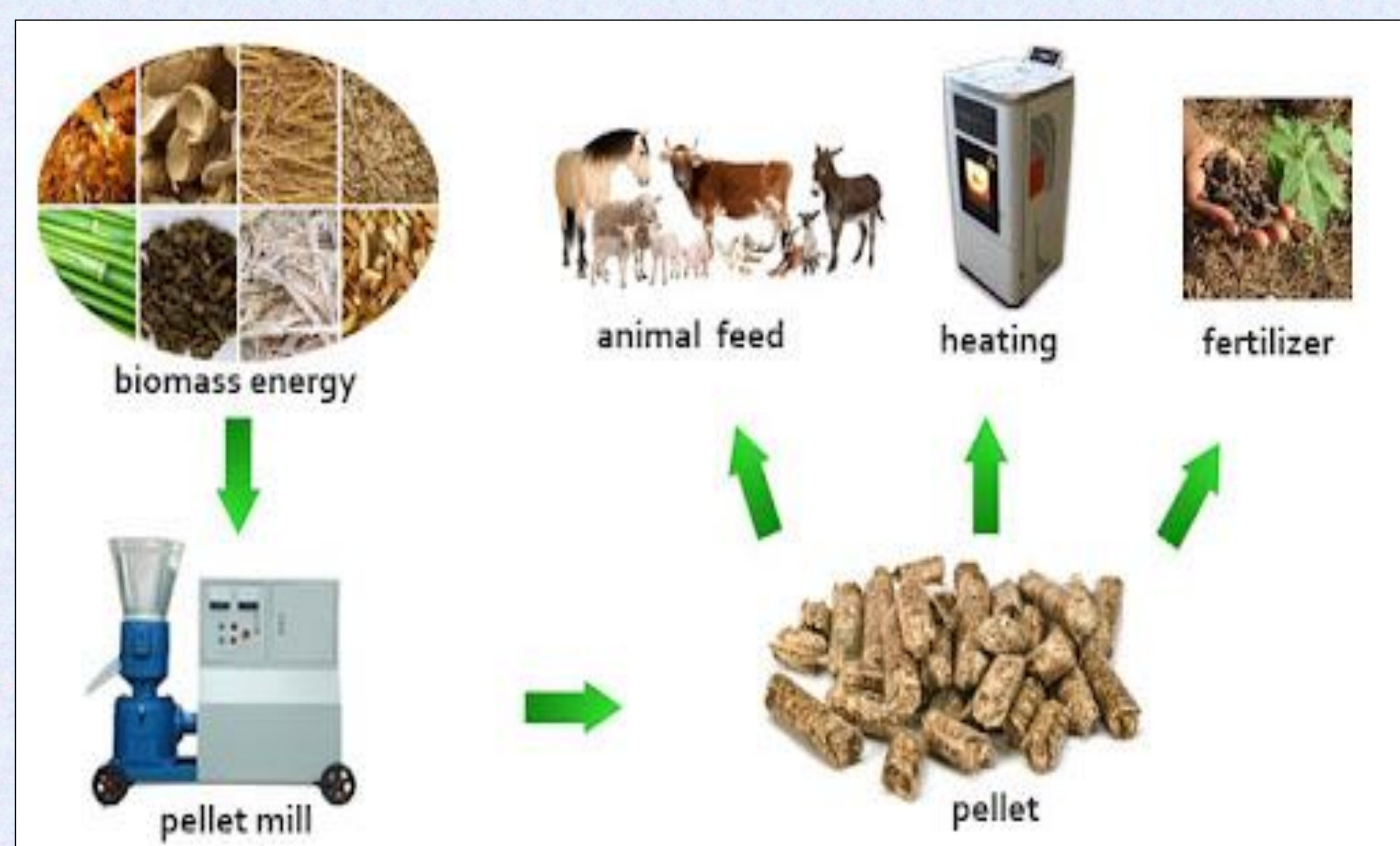
BIOENERGY POTENTIAL OF WOOD BIOMASS

The timber industry is generating the largest plant biomass source, although other sources, such as cereals, agricultural, urban, and industrial waste, are playing an increasingly important role in creating the energy balance. The gas formed during the decomposition of organic waste, with methane as the main component, is also a vital energy resource derived from biomass. Biofuels, bioenergy, and bioproducts are becoming increasingly popular as substitutes for fossil fuels. Their production is carried out by applying unique processes such as thermal distillation, and fermentation.



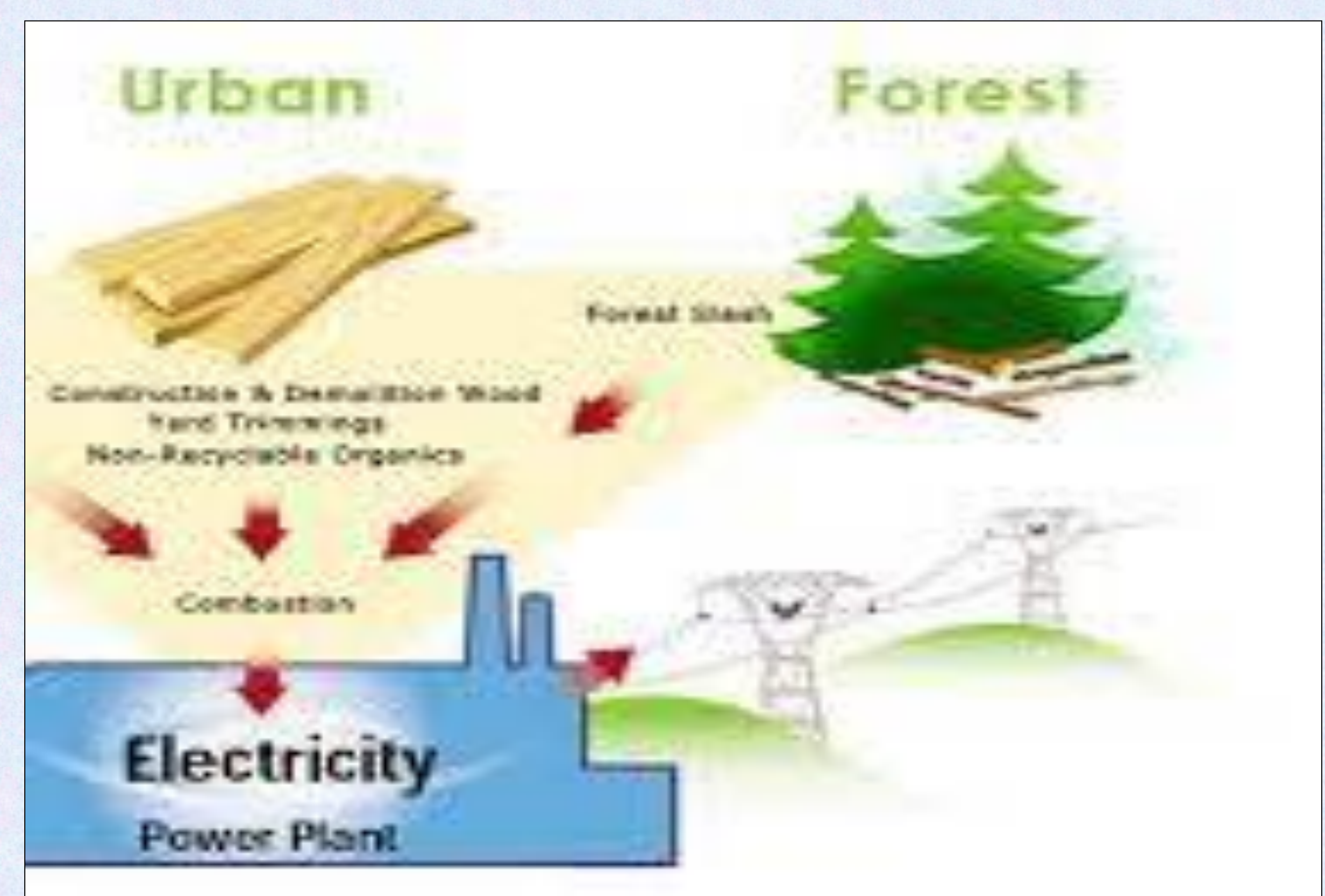
CONIFEROUS BIOMASS AND ITS APPLICATION AS A BIOENERGY RESOURCE

Biomass is the fourth largest energy source globally, after coal, oil, and natural gas. Among energy biomass, wood species are the primary source, with total wood fuel needs of about 70% in rural areas and about 35% in urban areas. In recent years, there has been an increasing interest in artificial ecosystems, which include coniferous species.



The primary way to use coniferous biomass as an alternative bioenergy source is its processing in the form of electricity through its joint combustion with the help of coal or pellets.

The usefulness of coniferous biomass is related to paper production (up to 60%), but all residual waste products have many advantages over other plant biomass. Coniferous biomass requires smaller amounts of additional materials for gluing as the wood part (stem) has a higher density than some other plant biomass (reed roots, wheat straw, and others).



Coniferous biomass can be used as an energy source in gas production through ethanol (so-called bioconversion). The conversion of coniferous biomass by converting lignocellulosic materials into ethanol will increase the alternatives for the recovery of coniferous waste. Bioconversion methods are based on a series of technological operations related to pre-treatment (grinding), saccharification, fermentation, and distillation.

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CONCLUSION

The use of coniferous biomass as a model of bioenergy resource ensures sustainable development of the bioenergy industry. Biomass processing and recovery technologies are an approach to moving the economy towards a more sustainable base. Biomass is an internal energy source and can significantly reduce dependence on imports of solid and liquid fuels. The widespread distribution of wood biomass and its involvement in energy production offers local, regional, and national energy independence opportunities. Through its use and adequate application, the economic performance of the regions can be improved through the use of agricultural residues, which will stimulate rural development in the fields of farming, forestry, and related service industries by creating new products and markets.

On the other hand, the use of renewable energy sources will improve many environmental indicators. Bioenergy resources can regulate nitrogen dioxide emissions, sulfur dioxide, greenhouse gas levels, soil conversion, soil erosion, carbon subsidies, and water resources in the region.