Water resources management balancing economic principles, ecological sustainability and political contexts, Murray-Darling River Basin in Australia

Problem statement: The Murray-Darling River Basin in Australia, which accounts for almost one-seventh of the total land mass of Australia, witnesses extreme spatial and temporal variation of rainfall. The rainfall, within the Basin, varies from 1,400 mm/ year in the highlands to 300 mm/ year in the northwest. The basin also witnesses large variation in seasonal rainfall year to year – annual variation to the extremes of 10,000:1 has been reported in the Darling river. Notably, the basin also has relatively low annual discharge compared to other river systems in the world.

Intervention: Water shortages together with environmental concerns and degrading water quality (as indicated by declining biodiversity, increase in algal bloom and water salinity), led to the adoption and evolution of various frameworks and legislations in the Basin related water allocation, inter-region water trading, water quality trading and water delivery and pricing, as discussed below.

- Cap on surface water diversion, along with periodic monitoring and audits, to contain the declining river health
    - Various caps on water diversion are set for the states
    - Periodic audits of compliance to the Cap on water diversions are enabled by the Murray-Darling Basin Agreement and agreements by the Council of Australian Governments (COAG). The Murray-Darling Basin Authority (MDBA) has developed Sustainable Diversion Limit Reporting and Compliance Framework to manage water use exceeding limits in dry and wet years. Compliance to these agreements are further incentivized through tranche payments to the states based on the status of the reforms undertaken.
    - Water allocation plans, as prepared at the local level, are given the status of statutory documents and thus states are accountable to implement them.
    - These Cap measures are further facilitated by introduction of inter-region water trading.
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    - Different instruments of water trading have been introduced like high security licences where agreed volume of water is provided except in drought condition

and low/ general security licences with varying water volume from year to year based on availability.

- Introduction of legislations by some states (like South Australia and New South Wales) allowing separation of land and water titles and practice of both permanent and temporary (say lease of water for a particular period) trades allows even persons with no land to posses water licence as an investment. Also, water title holders may sell surplus water without selling the land.
- To account for transmission gains and losses in the system, various exchange rates have been introduced; e.g. transfers upstream are assigned exchange rate of 0.9 (10 ML in South Australia = 9 ML in New South Wales which is upstream).

- Development of a system for dealing with salinity issues
  - Introduction of salinity interception schemes with various restrictions on states; e.g. states like Victoria and New South Wales are not allowed to approve any proposals, that may increase salinity by 0.1 EC in the Murray river, unless they have any access to salinity credits.
  - A Salinity Audit was undertaken to develop a new salinity strategy and strengthen the existing salinity interception schemes.
- Development of frameworks and legislations in relation to water pricing and delivery
  - Various economic considerations in relation to water pricing and fees collection were codified by the COAG in its water pricing policy.
  - Various states have established adequate institutional mechanisms to facilitate the cost recovery measures.
    - States like New South Wales have set up an Independent Pricing and Regulatory Tribunal (IPART) which is responsible for determining the cost structure for bulk water pricing.
    - In South Australia, a catchment water board is responsible for levying water charges based on future infrastructure and water requirements. Different pricing slabs are introduced for industrial and domestic users while irrigators with only valid licenses are allowed to draw water. All new infrastructure/ projects are approved based on full cost recovery principle.

- Involvement of various stakeholders and separation of the role of planning and regulation from operation
    - Skill based local boards, set up in various jurisdictions, are responsible for determination of water allocation.
    - Day to day operations and water delivery are entrusted to the corporations, who have no direct role in policy development. Many of the states have undertaken 'corporatization' of the operations of water delivery through involvement of private parties, e.g. the Murray Irrigation Limited, a private entity, holds around 75% of New South Wales general water security entitlements.

Impact: During the initial year, New South Wales recorded sales amounting to more than 10% of total entitlements while a two year pilot project in the Malle region of South Australia, Victoria and New South Wales saw trade volumes to the tune of 9.8 GL. Water trading facilitated the adoption of water efficient practices and gradual shift from lower to higher value agricultural products like viticulture and horticulture crops. Under the salinity interception schemes, states like Victoria and New South Wales have earned salinity credits of 15 EC. The salinity interception schemes led to reduced salinity in South Australia and more awareness and adoption of cost effective measures to protect irrigated lands from land degradation. 'Corporatization' of the water delivery mechanisms including the involvement of consortiums of private irrigators ensured buy-in from the water users in both the planning and delivery processes including cost recovery.

As on July 2020, 13 water resource plans are in place and over 2,100 GL of water is managed by the Basin's environmental water holders. The 2020 Basin Plan Evaluation report highlighted achievement of various positive ecological responses including delivery of adequate water to Coorong, Lower Lakes and Murray Mouth during the drought season. The report also noted how ongoing reforms in water trading markets (surface water), particularly in the well-established southern Basin market, have led to improvement in drought resilience and transition towards high value water usages.

Sustainability: In order to ensure the sustenance of the water management practices introduced earlier, it is imperative to update the provisions based on the recent developments. For example, the initially exempted institutes like Australian

Commonwealth Territory and Queensland need to adopt the water Cap measures to avoid any potential conflict with other water users who are currently under the ambit of the Cap measures. Various contentious issues like introduction of Cap on groundwater and farm diversions need to be reconsidered. To further facilitate the water trading mechanisms, there is a need to reduce the transaction costs (like the brokerage fees, time cost and approval costs). Also, provisions like strengthening the long-term commitments need to be introduced to account for the ecological impacts of the trade.

The Interim Report (August 2019) of the Australian Competition and Consumer Commission (ACCC) has highlighted various deficiencies in relation to settings and governance of water trading mechanisms, that are understood to undermine the efficiency of the trading mechanisms. The 2020 Basin Plan Evaluation report identified six priority areas for the future ranging from full implementation of Basin plan to adoption of various climate resilience and integrated water management practices to achieve social, economic and environmental outcomes.

(Reference: Darla Hatton Mac Donal and Mike Young, International Water Management Institute " A Case Study of the Murray-Darling Basin"; Murray-Darling Basin Authority "The 2020 Basin Plan Evaluation" https://www.mdba.gov.au/sites/default/files/pubs/bp-eval-2020-overview.pdf, Murray-Darling Basin Authority website https://www.mdba.gov.au*)*