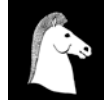




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# Technological Transformation and Water Conflicts in the Bhavani River Basin of Tamil Nadu, 1930–1970

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## ABSTRACT

This article examines in a historical perspective (1930–1970) the water conflicts that have occurred due to technological transformation in water lifting devices (viz.: electric and oil-engine pumpsets) in the agricultural sector in the old Kalingarayan channel and new Lower Bhavani Project canal of the Bhavani River Basin in Tamil Nadu. It discusses the consequences of technological transformation leading to water conflicts between the head-reach and tail-end farmers during the colonial and post-colonial periods. It also analyses the role of politicians in these conflicts. Further, it looks into government policies and the role of the judiciary in resolving these conflicts.

## KEY WORDS

Irrigation, technological transformation, water conflicts, Tamil Nadu

## I. THE PROBLEM

Competing demand for water among the different water using sectors – agriculture, domestic and industry – has lead to provocative claims and resultant conflicts among them, and also within each sector. This is particularly evident in agriculture in different parts of the world, especially in the developing countries.<sup>1</sup> The ever-increasing demand and the attendant conflicts which have found expression in different forms are widely visible in recent years in India, Pakistan, Spain, Nepal, Africa, Java, Bangladesh, Indonesia, Sri Lanka, Mexico, etc.<sup>2</sup> Within the agricultural sector, different kinds of conflicts persist. For instance, in Sri Lanka disputes over water allocation have lead to violent clashes, damage to systems, threats of court cases and intervention by politicians with vested interests.<sup>3</sup> Further conflicts also exist among the groundwater users.<sup>4</sup>

In India, demand for water has escalated since the early twentieth century, due to rapid growth in population, urbanisation, industrialisation and the expansion of agriculture.<sup>5</sup> The competing demands of the various sectors have aggravated this crisis in different parts of Indian sub-continent, particularly since independence. In the 1990s, about 93 per cent of the gross water use in India was for irrigation. It is expected that by 2025 the demand for water for domestic consumption will double, and that for industrial purposes and power generation it will increase seven-fold.<sup>6</sup>

In addition to the competing demands among the different sectors, within the agricultural sector technological transformation – electric and oil-engined pumpsets, mechanisation and the introduction of hybrid seeds – have created more demand for water, especially during and after the green revolution period.<sup>7</sup> Increasing competition has increased the frequency of conflicts, as well as aggravating their intensity.<sup>8</sup> Due to these mounting pressures, sustainable use of this scarce resource has become an increasingly difficult task in recent years.<sup>9</sup> Contesting claims among the different irrigators and different sectors, according to customary rights and existing law, have been subjects of intense negotiation.<sup>10</sup> The present article attempts to analyse in a historical perspective (1930–1970) the conflicts consequent on the emergence of competing demand for water in the agricultural sector; the role of politicians, judiciary and other groups of people; and the changes effected in statute through the negotiation of water rights during this period of technological transformation.

The past century has witnessed many conflicts among nations and within countries over the sharing of river waters. For instance, India and Bangladesh have locked horns over sharing the Ganga water, while in India, the four southern states – Karnataka, Tamil Nadu, Kerala and Pondicherry – are engaged in a bitter and prolonged dispute over the Cauvery water. Sometimes conflicts emerge between individuals and groups at the local level, sometimes between the river basin people of various states, and also directly and indirectly between the states.<sup>11</sup> Due to political factors, between the states and at times also at the centre, even the intervention of the Supreme Court, tribunals or the Union government has not always resolved the conflicts, as is evident from the Cauvery water disputes.<sup>12</sup>

Within the states, more precisely in the basins or channels, diversion of water for domestic and industrial supply had led to conflicts among the different water-using communities as early as the close of the nineteenth century.<sup>13</sup> In the canals, a major conflict was that between the tail-end farmers and head-reach farmers of main canals, branch canals, distributaries, minors and field watercourses.<sup>14</sup> This was due to the excess area planned to be under irrigation.<sup>15</sup> It was estimated in 1980 that only 80 per cent of the canal potential created since independence was being used.<sup>16</sup> In the early stages, as soon as the headwork was complete the whole supply was distributed even before the completion of the canal system.

Ultimately, the head-reach farmers claimed more than their originally planned share of water and also increased unauthorised cultivation.<sup>17</sup> This, coupled with the additional cultivation of water intensive crops in farm lands adjoining the canals, resulted in unequal distribution to the tail-end.<sup>18</sup> Consequently, there has been a prominent collective response from the tail-end farmers, afflicted by perennial scarcity and uncertainty of water supply.<sup>19</sup> Wade has demonstrated the correlation between water scarcity and different forms of collective action at the village level.<sup>20</sup> The common methods of representing the grievances were submitting petitions, filing police cases or seeking court intervention – by individuals, groups of people and the officials of the Public Works and Revenue Departments against other individuals, groups of people or officials. Most of these grievances remained unresolved for a long period.<sup>21</sup>

Likewise, in the tank system, the tail-end farmers have the weakest water management institutions. In the distributaries, risk and scarcity depend upon the water supply, while in the tank system the water demand is determined by the soil type.<sup>22</sup> In some cases where there were no local water users' associations, whenever a conflict arose over water distribution, the farmers used to take it up with the officials. Even where associations existed, they were reluctant to intervene between the quarrelling farmers.<sup>23</sup>

During periods of scarcity, the tail-end farmers receive a smaller proportion of water than the head-reach farmers, confirming Wade's observation that the 'tail-enders tend to be the poorer'.<sup>24</sup> The tail-end farmers were thus forced to arrange for their own supply through wells and tube-wells.<sup>25</sup> Even in the tank system, conflicts emerged between the tail-end and head-reach farmers,<sup>26</sup> with the aggrieved parties petitioning the courts for adjudication. Court judgments, on water conflicts or risks and on disputes over water flow in the tank system, were guided generally 'on the basis of "natural" water flow, customary use and entitlement by grant'.<sup>27</sup>

In addition to the above, installation of electric and oil-engine pumpsets created new forms of conflict, not only in well and tank irrigation but also in the canal irrigation.<sup>28</sup> Folke, who attempted to analyse water conflicts from the point of view of political economy, found that in the context of unequal social relations, the dominant castes had an upper hand both in having access to water resources and in emerging unscathed in water conflicts.<sup>29</sup>

Resolution of conflicts by administrative, judicial or political means would not be permanent, as new forms of conflicts arose during the development process.<sup>30</sup> Hence, water conflicts are an integral part of development. Studies on tank irrigation system have concluded that:

'Traditional' systems are often inequitable and do not meet the needs of poorer, lower castes or tail-enders or female farmers. The caste-based roles involved in tank management can re-enforce social hierarchy and increasingly result in

dispute, withdrawal and system collapse. Indigenous water allocation systems have not been adaptable to changes, especially those in the pattern of wet-land ownership or changes in cropping (e.g., the demands from new cash crops). Such changes have generated social conflict and the breakdown of water management systems.<sup>31</sup>

This has been further substantiated by Rajagopal:

Appropriation of water becomes more problematic when the tail reaches belong to minority/ scheduled castes and when they are less powerful than head reaches economically and politically.<sup>32</sup>

The role of the bureaucratic/administrative machinery in water management has been emphasised prominently in recent researches.<sup>33</sup> Studies on canal water management have largely focused on the role of bureaucrats, their corrupt practices in association with the politicians in fleecing the farmers, and the transfer mechanism being practised by the administrators. These aspects were extensively analysed by Wade with reference to Andhra Pradesh.<sup>34</sup> Until the early 1970s, irrigation policies, which mainly focused on technological upgrading, had neglected the institutional considerations.<sup>35</sup>

Due to technological development either more area was brought under irrigation or cultivation of water intensive crops was extended, which led to conflicts among the farmers. When attempts were made to impose restrictions or penalties to contain newer demands, the intervention of politicians or the farmers' seeking judicial remedy tied down the hands of implementing authorities.<sup>36</sup> To retain their vote banks, the politicians either favoured their caste groups or were forced to support the illegal extractors in the various canal systems.<sup>37</sup> Subsequently, these issues were addressed at the government level through attempts either to regulate irregular water extraction or to effect policy changes. Mollinga found evidence in certain cases of the involvement of politicians in the distribution of water, right down from the canals to the local level,<sup>38</sup> and he claims that 'the authority of the irrigation bureaucracy weakened through increased "political interference"'.<sup>39</sup> Intervention by politicians has crippled and made ineffective the functioning of government officials in various canals.<sup>40</sup>

In this paper an attempt has been made to analyse the role of politicians and the judiciary in the context of technological transformation in the agrarian system during the colonial and post-colonial period (1930–1970). What is technological transformation? Transformation means a complete change. Sometimes it is used to denote a 'change' and/or 'transition'. According to Schultz, '... the notion of "technological change" is in essence a consequence of either adding, or dropping, or changing at least one factor of production'.<sup>41</sup> But in this article, it is employed to convey the complete change from traditional water lifting devices to totally mechanical devices viz., oil-engines and electric-pumpsets.

Until independence, power generation was mostly undertaken by the state governments and to a small extent by the local governments and private companies.<sup>42</sup> In Tamil Nadu, power generation had commenced in the early twentieth century, both in the private and government sectors. At the close of the first quarter of the twentieth century, there were two undertakings – one at Madras (at present known as Chennai) and another at Otacamund in Nilgiri district (Udhagamandalam) – which distributed power supply to the public, mainly for household purposes. In 1927, the Electricity Department was established in Tamil Nadu,<sup>43</sup> and subsequently the Pykara and Mettur projects were started. In 1938/9, both the Pykara and Mettur power stations were supplying electricity to Coimbatore, Erode, Tiruppur, Udumalpet and other northern parts of Tamil Nadu for irrigation.<sup>44</sup>

Electricity supply for lift irrigation was a basic step in the introduction of modern technology in agriculture, enabling extensive exploitation of sub-soil water resources because mechanised sources of farm operations are less costly than human and animal labour.<sup>45</sup> Electric water lifting devices are more economical than diesel-engines both in terms of capital and operational costs,<sup>46</sup> and have longer life expectancy.<sup>47</sup> The low cost of both energised pumpsets and tube-wells led to a rapid exploitation of groundwater resources.<sup>48</sup> For example, in the Bhavani river basin, water extraction from 30–40 feet in the 1950s had gone deeper by 700–1000 ft in the 1990s.<sup>49</sup> In 1933/4, there were only 8 pumpsets connected to electricity. This number had increased to 11,189 in 1949/50, and further to 225,192 in 1964/5.<sup>50</sup> At the end of the Fourth Five-Year Plan (1974), the total number of pumpsets in Tamil Nadu had gone up to 681,205.<sup>51</sup> Of this, 134,475 pumpsets (about 20 per cent) were situated in Coimbatore district.<sup>52</sup> The number of electric pumpsets would be naturally high in Coimbatore and Erode regions where, besides production of power, electric motor factories were concentrated.

Manufacture of technologically upgraded water lifting devices – centrifugal pumps – was started by two industries (PSG and OPF) in Coimbatore around 1952.<sup>53</sup> In 1956, there were three large-scale and eight small-scale irrigation pumpset manufacturers in Coimbatore city. These developments facilitated the installation of pumpsets with electric motors by farmers in neighbouring areas. The cost of irrigation per unit of water was less for the electric pumpsets than oil-engines and other traditional water lifting devices.<sup>54</sup> The cost of lifting 1,000 gallons of water ranged from 0.2 to 1.4 paise per unit for electric pumpsets, 1.4 to 2.7 paise for oil-engine pumpsets and 1.8 to 4 paise for the traditional bullock mhothe.<sup>55</sup> In other words, the cost of irrigation by bullock power was around Rs.200 per acre, by diesel pumpset Rs.83 and by electric pumpset less than Rs.56.<sup>56</sup> Furthermore, bullocks could not be relied upon to draw water from deep wells.<sup>57</sup> The increase in the consumption of electricity compared with the other sources of energy was further encouraged by increasing efficiency in transmission and utilisation.<sup>58</sup>

The Tamil Nadu Government's policy emphasised rural electrification, with special concessions for the agricultural sector. In fact, both the central and state governments encouraged 'power supply for irrigation in order to make and keep the country agriculturally self-sufficient'.<sup>59</sup> As already mentioned, electric pumpset industries in Coimbatore commenced production in the 1950s and their number had swelled to 139 in 1974. Every year huge numbers of electric motors were produced. For instance, in 1973/4, 93,989 centrifugal pumps and monoblocks, and 41,160 electric motors were produced. The concentration of pumpset industries in and around Coimbatore district could be attributed to developed well and canal irrigation and to massive rural electrification through the Pykara system.

And there were, around Coimbatore, rich and progressive farmers (cotton growers) ready to invest in irrigation pumps.<sup>60</sup>

[T]he impact of mechanisation on the use of animals is more pronounced than on human labour. Much the same is true of Coimbatore, which has also experienced a phenomenal expansion in the use of energised pumpsets and a significant growth in the use of tractors, though not of mechanical threshing.<sup>61</sup>

By the 1980s, the 162 revenue villages within the command area of Lower Bhavani Project (LBP) accounted for 11,822 energised wells, 7,399 wells fitted with oil-engines and 6,154 wells with bullock-baling.<sup>62</sup>

The rapid increase in groundwater exploitation for irrigation, domestic, industry, livestock and other uses led to conflicts in many areas.<sup>63</sup> Legal rights to water resources varied between the people and the government. Excepting private wells and tube-wells, the government had powers to regulate artificial tanks and lakes, natural tanks and lakes, public wells and tube-wells over which the farmers had either customary rights or usufruct rights.<sup>64</sup>

Groundwater extraction rights were customarily associated with land ownership.<sup>65</sup> 'Land owners generally regard wells as "theirs" and view others as having no right to restrict or otherwise control their right to extract water'.<sup>66</sup> But recently, though the judiciary had acknowledged the customary rights, the government proclaimed its absolute rights over all natural waters.<sup>67</sup>

[T]here is no fundamental right of access to water. Land owners have an absolute right to the water under their land.... The amount of water it is legally possible to extract does not depend on the amount of land owned. Any land owner can abstract any amount of water.... The rights granted under such a legal framework are inappropriate in a socialistic society and do not suit the interests of the nation as a whole. Since the attachment of water rights to land ownership can violate the fundamental right of life, the current water rights structure needs to be modified

to ensure equitable distribution of this resource, particularly for those who do not own land.<sup>68</sup>

The use of traditional water-lifts has been made increasingly difficult for small farmers by the increased exploitation of groundwater by their richer neighbours and the consequent depression of the groundwater table.<sup>69</sup> The swelling number of tube-wells has particularly affected the dug wells, mostly owned by the small farmers.<sup>70</sup> The simultaneous increase in wells and pumpsets has resulted in a drastic rise in groundwater extraction.<sup>71</sup> Recently, the large scale installation of tube-wells with energised pumpsets has also caused a sharp drop in the water table.<sup>72</sup> Installation of higher horse-power pumpsets aggravated the situation as the sub-soil water became depleted at an alarming rate. Given the disappointing performance of the canal systems in terms of their failure to provide a more controllable, predictable and reliable water supply, most of the farmers were prepared to install tube-wells for timely and precise water management to achieve more yields and profits.<sup>73</sup>

Arguing that irrigation is a 'technological' input in production, Bharadwaj has suggested that 'the interaction between the irrigation technology and the social relations [impinges] on the dynamics of development of the region as a whole'.<sup>74</sup> In this context, the present study attempts to analyse the technological transformation of changing water lifting techniques and its consequences on irrigation management and attendant issues in Tamil Nadu between 1930 and 1970, the roles of bureaucrats, politicians (Members of Parliament and Members of Legislative Assembly) and judiciary, and the changes in government policies pertaining to both the old Kalingarayan channel and New Lower Bhavani Project canal areas. It also shows how the representatives of the ruling party had favoured those belonging to their own caste/community and attempted to modify the rules and regulations to suit them at the cost of the tail-end farmers. It further proceeds to identify the root causes of water conflicts and how they were resolved, either by means of judicial/administrative intervention or by the politicians. In short, it attempts to understand the water conflicts in their various facets and the colonial as well as post-colonial state's capacity in accommodating the demands.

This article consists of four sections. The problem was introduced in the first section. The second section analyses the conflicts that are a corollary of technological transformation, political intervention and government policy in the Kalingarayan channel between 1930 and 1970 along with the role played by the judiciary. The third section discusses the conflicts together with technological transformation, cropping-pattern and the government's policy and legislation aimed at dispute resolution in the LBP canal between the 1950s and 1970s. The last section makes some concluding observations.

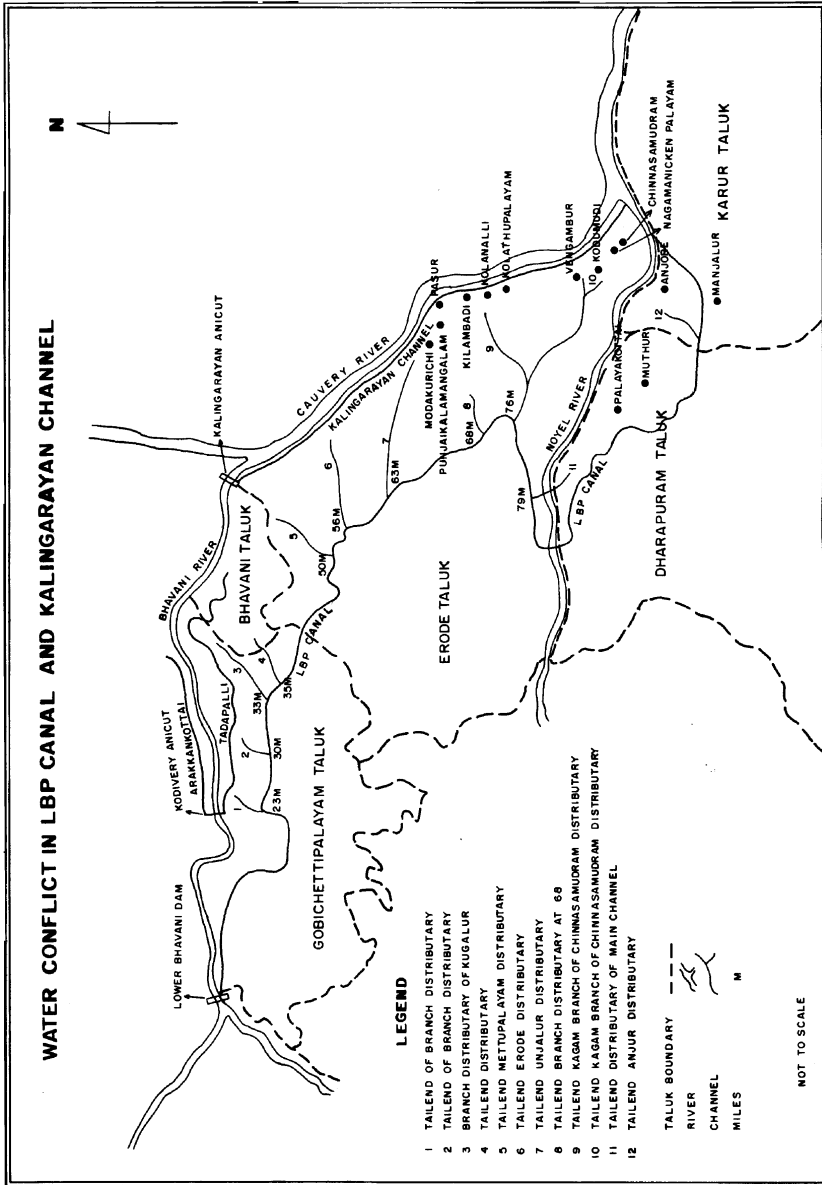


## II. WATER CONFLICTS IN THE KALINGARAYAN CHANNEL

Since the early thirteenth century, the Bhavani river water has been diverted for irrigation purposes through the Kodiveri<sup>75</sup> and Kalingarayan anicuts (see Map 1). A rough-stone anicut known as Kalingarayan anicut, built by an ancient Tamil king during the early thirteenth century and located just before the Bhavani river's confluence with the river Cauvery, diverts the water to its right in the Kalingarayan channel. Also known as *Konavaikkal*, it irrigates about 13,460 acres of wet crops through 769 sluices.<sup>76</sup> All the command areas, enjoying riparian rights, are located only on the left bank of the channel.

The channel takes off on the right side of the Kalingarayan anicut, extending up to 36 miles and irrigating wet crops in about 13,460 acres which alone had riparian rights.<sup>77</sup> 'Riparian rights have allowed holders to use water flowing past their land as long as the supply reaching downstream users is undiminished in flow, quantity and quality'.<sup>78</sup> Riparian rights were established by the court as follows: '[A] riparian owner has a right to use the water of the stream which flows past his land equally with other riparian owners, and to have the water come to him undiminished in flow, quantity or quality and to go beyond his land without obstruction'.<sup>79</sup> However, riparian rights were not considered by the government, due to the ever-increasing demand for water over the period; according to Sengupta, 'Neither riparian nor prior appropriation rights of private parties, of farmers and companies alike, are secured'.<sup>80</sup> Until 1933, water from this channel was not used by the right-bank non-ayacut highland farmers for cultivation.<sup>81</sup> No account is available about water management until the early nineteenth century. The available accounts relate to cropping-pattern, maintenance and repairs, indicating the absence of any restriction on the type of cultivation in the Kalingarayan channel ayacut area.

As in other irrigation systems, in the Kalingarayan channel water distribution and maintenance were managed by the ayacutdars under the *kudimaramattu* system, which existed even prior to the colonial period.<sup>82</sup> *Kudimaramattu* was a contribution of labour for petty repairs to irrigation works, which the farmers were bound to give according to ancient tradition. Also known as 'village labour', 'communal labour', 'maintenance works', 'village repair' and 'community management', this existed before the colonial period.<sup>83</sup> The main responsibilities of the *Kudimaramattu* system were: a) To fill up gullies or other inequalities caused by rain and cattle upon the bunds of the tanks and channels; b) To check the growth of the prickly-pear and any similar rank and pernicious weed on bunds; c) To clear away such underwood from the tank bunds as may be considered by the range officer to be injurious; d) To clear away the deposits from tank sluices and from the river and spring channels to afford a sufficient opening for supply of water for flow; e) To clear and repair the earthworks of petty and branch channels, and clear away the accumulations which obstruct the



MAP 1. Water conflict in LBP Canal and Kalingarayan Channel.

flow; f) To keep in order the supply channels of tanks to such extent as was sanctioned by local custom; g) To watch the bunds to prevent breaches, leakage and other accidents and to open and close the *calingulas*;<sup>84</sup> h) To construct ring dams at breaches, and where required temporary strengthening of tank bunds during the season of cultivation; and i) To inform the officers about uncovering the sluices in tank bunds for repair.<sup>85</sup>

Actually, the *Kudimaramattu* works were done by the Nirkkatti, a village water distributor who has to maintain the reservoir, and inspect frequently the toom, or outlet from the tank to fields, to prevent unnecessary and unusual expense of the water. His duty was to distribute water impartially to each field under the orders of the village headman, in quantities proportionate to the extent of land and stage of the crop.<sup>86</sup> In this local organisation unauthorised diversion was restricted by the imposition of penalties. Maintenance of the channel was undertaken by the farmers themselves. In other words, 'the great majority of the indigenous irrigation works were locally managed'.<sup>87</sup> For most tanks in Tamil Nadu, the maintenance of distribution network and regulation of water use were well defined – informally of course by the village level organisations, but for some tanks written rules have also been found.<sup>88</sup> The *Kudimaramattu* system ensured effective distribution of water and maintenance.

In contrast, the colonial government, which undertook irrigation management in the later period, neglected both distribution and maintenance of the channel and tank systems.<sup>89</sup> Consequently, the traditional water management system was eroded in south India during the colonial period.<sup>90</sup> According to Mosse, the decline of tank systems

did not result from a collapse of community co-operation or a 'tragedy of the commons', but rather from the wider political and economic changes brought by colonialism.<sup>91</sup>

... [because] the principles of indigenous resources management are not easily transferable to new development contexts, and ... many aspects of 'traditional' tank management are anyway undesirable.<sup>92</sup>

Anyhow, due to these changes, a number of conflicts arose in water management. Jose refers to the 'rising prominence of centralised bureaucracy and the consequences it has on the functioning of agrarian societies, manifested through the breakdown of traditional labour sharing arrangements, non-participation of the beneficiaries in decision-making on management of the system and the rise of conflicts among water users at various points'.<sup>93</sup> In the Madras Presidency, the government's involvement in tank repairs and restoration was insignificant or negligible till the early twentieth century.

Although in south India the colonial government had to create a whole department for tank repairs, in hundred years it never developed into anything more than a mere financing and labour employing agency.<sup>94</sup>

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In the Kalingarayan channel, the government permitted lifting water through *picottas*<sup>95</sup> for extension of irrigation in the uplands of the non-ayacut area on the right bank, which did not have riparian rights in the early twentieth century.<sup>96</sup> However, the government imposed certain restrictions, which included that the water lifted should be used only for dry crops without exceeding the permitted ayacut area i.e., 500 acres. No conflict erupted as long as water was lifted from the channel through traditional methods for the dry crops. Contrary to the regulations, during the 1940s, the right bank head-reach farmers started installing electric and oil-engine pumpsets and cultivated wet crops, mainly paddy, in the 'permitted' non-ayacut area under this channel.<sup>97</sup> The increased volume of water lifted by these non-ayacut farmers caused a scarcity for the tail-end ayacut farmers, leading to conflicts in the 1940s.

In the Kalingarayan channel, water was used by means of sluices in the traditional manner and whenever the water level fell below the requirements in the channel, the turn system<sup>98</sup> was followed. The turns would

... be regulated by the Sub-Divisional Officer's written orders on each occasion which shall also be communicated to the Tahsildar, but should it be necessary for the Section Officer or Sub-Overseer to anticipate his orders by reason of urgency, this disposal shall be immediately committed to writing and shall be forwarded to the Tahsildar for information and to the Sub-Divisional Officer for approval.<sup>99</sup>

In 1933, the Chief Engineer had permitted extension of the command area by 500 acres and allowed the upper-reach highland non-ayacut farmers of the right-bank to lift water from the channel through bullock lifts for dry crops. The farmers also agreed to pay the land-rent at the rate of 25 per cent of wet lands. However, this did not affect the water supply to the tail-end ayacut farmers and in fact no dispute occurred due to lifting of water by the head-reach highland farmers. Because, unlike most of the channels, which culminate at a dead end, the Kalingarayan channel finally joins the river Cauvery. The unused or 'surplus' water was allowed to drain-off into the Cauvery.

During the 1940s, although the collector had refused permission for oil-engines, economically well-off right-bank head-reach highland non-ayacut farmers had installed about fifty pumpsets and oil-engines and extended irrigation besides cultivating wet crops.<sup>100</sup> This led to a scarcity of water supply for the tail-end farmers, who protested and made petitions to the local authorities and sent a memorandum to the Revenue Minister, Government of Madras, seeking the necessary action to provide them with adequate water for cultivation. The local government officers directed the head-reach highland farmers to remove their unauthorised energised pumpsets but they did not oblige and decided to challenge the order in the court. Thus, the changing mode of water lifting for irrigation and cropping pattern in the head-reach non-ayacut areas of the Kalingarayan channel during the second half of the twentieth century had

brought attendant conflicts. Further, it paved the way for the rich and large landholders to become richer, while the tail-end farmers struggled to make a livelihood. Appropriation of water by rich and large landholders led to wide inequality between the head-reach and tail-end farmers.<sup>101</sup> Though this appropriation of water may have brought about agricultural development in general, it inevitably created inequalities between the head-reach and tail-end farmers. Consequently, the poor farmers could not claim their rights through legal means due to their lack of finance and political patronage.<sup>102</sup>

On 6 July 1953, the farmers of the tail-end<sup>103</sup> villages who irrigated lands fifty-three miles below in Erode taluk of Coimbatore district, complained that they did not get adequate water supply. They pointed out that this was due to the right-bank head-reach non-ayacut farmers illegally lifting more water through electric and oil-engine pumpsets for raising wet crops between miles twenty and forty on the upland villages (see Map 1).<sup>104</sup> Even though water was passing at the maximum level at mile twenty, there was not an adequate supply for the tail-end farmers. Therefore, they argued that irrigation on the right side of the channel, which did not have riparian rights, should be closed down.<sup>105</sup>

In 1933, the Collector had permitted the upland head-reach non-ayacut farmers to lift water only through bullock lifts for dry crops. They had used the channel water until the 1940s as per the government's directions. In 1946, some of them applied to the Sub-Divisional Officer for a water ticket.<sup>106</sup> But he had stated that no water ticket was necessary as the lands were in the Collector's approved list.<sup>107</sup> In 1950, the Collector, while conceding baling through *picottas* or by any other power appliance, said *tirwa*<sup>108</sup> would be fixed on that basis. However, since 1948/9, farmers in the upland villages using electric and oil-engine pumpsets had extended the area under wet crops. Faced with inadequate water supply, the tail-end farmers continued to press for the removal of unauthorised pumpsets installed by the head-reach upland farmers. In response, the Tahsildar served show-cause notices on 24 September 1952 and 17 November 1952 for removal of the unauthorised pumpsets. But only a few farmers obliged. Even when the Collector passed an order to this effect, the upland head-reach farmers paid no heed.<sup>109</sup> Consequently, the Tahsildar of Erode filed twenty-six criminal complaints against those who had failed to comply.

Initially, the penal assessment of one time water rate was levied under the Board of Standing Orders (BSO). According to BSO 4(11),

Whenever water is irregularly taken from any Government source or work to any land for purposes of irrigation, the Collector, divisional officer, tahsildar or deputy tahsildar may impose enhanced rates of water-cess in accordance with such rules as may from time to time be made by Government on their behalf.<sup>110</sup>

The Irrigation Act 1865 also empowered imposition of penalty. According to Section 1(b) of the Irrigation Cess Act,

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Whenever water from any such river, stream, channel, tank or work, by direct flow or percolation or by indirect flow, percolation or drainage from or through adjoining land, irrigates land under cultivation, or flows into a reservoir and thereafter ... irrigate any land under cultivation, and in the opinion of the Revenue Officer empowered to charge water-cess, subject to the control of the Collector and the Board of Revenue, ... it shall be lawful for the State Government ... [to] prescribe the rules under which, and the rates at which, such water-cess shall be levied, and alter or amend the same time to time.

The Board of Standing Order (4) framed the rules for levy of enhanced water-cess for irregular irrigation. Accordingly on the first occasion it would be twice the normal water-cess; on the second occasion five times, on the third ten times and on the fourth or any subsequent occasion twenty times.<sup>111</sup> Penalties were imposed based on the above. Yet, illegal irrigation indulged in by the head-reach upland farmers could not be stopped. On the contrary, the number of unauthorised pumpsets only increased. Even now, the government imposes a penalty for unauthorised pumping in the Bhavani river basin. However, illegal pumping in the Kalingarayan channel had been regularised over the period following representations to this effect from the farmers concerned to the government through farmers' associations and political leaders.<sup>112</sup>

The Collector had authorised the Tahsildar to launch prosecution before the Sub-Magistrate, Erode, against these 26 ryots and subsequently chargesheets were filed.<sup>113</sup> The farmers could not file cases against the government authorities after the 1945 amendment to the Irrigation cess act. According to Section 4(1) of the Tamil Nadu Irrigation Cess (Amendment) Act, 1945

No suit or any other proceeding shall lie against the State Government, or any officer or servant of the said Government, or any authority subordinate to them, or any person acting under the authority of or with the permission of the said Government, officer, servant or authority, in respect of any act done or purporting to be done under section 1 of the said Act before the commencement of this Act if such Act could have been done under the said Section 1 as amended by this Act, and the State Government and all officers, servants, authorities and persons aforesaid are hereby indemnified and discharged from all liability in respect of all such Acts.

Hence, the farmers filed writ petitions in the High Court, Madras, under Article 226 of the Constitution of India.<sup>114</sup> Before the government could move the court, (in 1953) the head-reach upland owners had filed two writ petitions<sup>115</sup> in the High Court, against the Collector of Coimbatore and Tahsildar of Erode taluk, challenging the penalty levy of twenty times of the normal water cess for illegal irrigation. The collection of the penalty was stayed by the High Court.

An interesting point to be considered here is that K. Periyasami Goundar, Member of Parliament (MP) from Erode, had acted in favour of the head-reach upland farmers to help them retain their unauthorised pumpsets.<sup>116</sup> The MP was

a member of the Congress party, which was in power both at the centre and in the state, and was himself a landlord; his relatives and party men also had lands at Palanigoundanpalayam below Pasur village (head-reach). Despite the fact that Kalingarayan channel was within his constituency, the MP supported the head-reach upland farmers, as most of them belonged to his caste, the dominant Goundar community.<sup>117</sup> This has been further substantiated by case studies: a study by Mariasusai (1999) shows that despite several petitions and police complaints made by the individuals, group of people and officials of the Public Works and Revenue Departments, against the violations and appropriation of water by the head-reach farmers the officials were unable to take any action due to casteist and political support enjoyed by the offenders. Even if the court cases went in favour of the petitioners, the court directives were not enforced due to caste and political patronage for violators.<sup>118</sup>

Eleven peasants together filed a writ petition in 1953 against the Collector of Coimbatore and Tahsildar of Erode taluk. All but one of the litigants were of the Goundar caste.<sup>119</sup> Though the tail-end farmers also belonged to the same community, they could not exert any influence in the administration because the Member of Legislative Assembly (MLA) representing the tail-end villages, K.R. Nallasivan, was of the Socialist party. The ruling party (Congress) politicians inevitably had more influence in the administrative power structure. As a result, the local administration was unable to remove the unauthorised pumpsets. Thus partisan political intervention to protect the illegal water users, with utter disregard to the problems of the tail-end peasants, led to fierce disputes among farmers in the Kalingarayan channel. The study by Mariasusai reveals that in the LBP canal politicians hailing from the dominant caste extended support to their own caste people whenever they violated the rules for fetching water.<sup>120</sup> Further, they have helped to regularise the violations through their power and linkage with the government. The study clearly shows that the dominant caste landholders, particularly large landholders, violated the rules and regulations in the river basins with political patronage. On the contrary, it was very evident that those who did not have political support, particularly the lower caste people and small and marginal farmers, were forced to suffer through denial of their democratic rights.<sup>121</sup> With the support of politicians, the head-reach upland farmers attempted to regularise their unauthorised pumpsets. Taking up their cause, K. Periyasamy Gounder, MP, in a petition on behalf of fourteen farmers from the upland villages,<sup>122</sup> stated that over the past twenty-five years their lands had been irrigated by means of bullock lifts from the channel. In reality, the farmers had switched over to mechanised irrigation instead of bullock lifts. The Public Works Department (PWD) authorities did not object to the installation of electric and oil-engine pumpsets. The Chief Engineer had fixed 500 acres as the limit to which irrigation on the right bank of the channel in the upland villages would be allowed. Then followed demands that the existing pumpsets be regularised and that the intended prosecution and levy of penal assessment be stayed.<sup>123</sup>

## WATER CONFLICTS IN TAMIL NADU

In April 1953, seventeen persons from the upland villages<sup>124</sup> filed a case against the State of Madras and Vadakkupudupalayam, Vengamputtam, Pallakattuputhur and Kodumudi villages, stating that the defendants had no absolute right to supply of water and contending that due to the installation of pumpsets there was no increase in the area under cultivation. The head-reach upland farmers claimed that their lands were under the *mamool* list<sup>125</sup> for which they had spent huge amounts on levelling, waterways and the construction of engine rooms. Further, in support of their claim, they cited the notice of the Collector dated 5 July 1950 stating that baling might be done by *picottas* or by any other power appliance with the *tirwa* being fixed on that basis. Based on the above, they sought the following relief: 1) a declaration that they were entitled to take water for their lands with pumpsets; 2) to restrain the defendants by an injunction from interfering with the plaintiffs working on the pumpsets; 3) that the government pay back penalties levied on the plaintiffs during the past five years (1945–1950); and 4) to direct the government to pay damages for the illegal interference in working with the pumpsets.<sup>126</sup>

Village	Whether included in the <i>mamool</i> list	Whether water ticket has been obtained	Whether complaint under sec. 430 IPC has been filed	Mode of irrigation	Whether pumpset permitted
Nanjai Uthukuli	yes	no (not necessary)	yes	unauthorised pumpsets	no
P.Kolanalli	yes	no	yes	do	no
N.Uthukuli	yes	no	yes	do	no
Kolathupalayam	yes	no	yes	do	no
Kolathupalayam	no	no	yes	do	no
P.Kolathupalayam	yes	no	yes	do	no
Modakurichi	yes	no	yes	do	no
N.Uthukuli	yes	no	yes	do	no
Pasur	yes	no	yes	do	no
P.Kilambady	—	no	not prosecuted	—	—
P.Kilambady	—	no	not prosecuted	—	—

TABLE 1. Details of illegal river pumping from the Kalingarayan channel as on 2 July 1953.

Source: Letter from the Collector, Coimbatore to the Secretary to Government through the BOR, 22 July 1953, Tamil Nadu State Archives, Chennai (hereafter TNSA).



The Collector, in a rejoinder, had reported that all the lands were not in the *mamool* list. They were classified as dry land and the government was not under any obligation to supply water to them (see Table 1). According to the Collector, though entered in the *mamool* list, the permission to these lands for lifting water was liable to be cancelled at any time without assigning any reason. The farmers had installed unauthorised oil-engines taking away a major share of the water to the detriment of the downstream agriculturalists. The revenue authorities held that irrigation with the help of oil-engines was in contravention of the conditions. Inclusion in the *mamool* list per se does not confer any right to water supply by the government to the owners of the dry lands. Of the 42 cases of pumpsets, head walls and pipe sluices had been constructed only in a few cases. Hence there was no means of controlling water supply to the pumpsets.

Based on the Collector's report the government had passed the following order:

All the lands which are claimed to be in the *mamool* list are not in fact in the *mamool* list. Even in the case of lands in the *mamool* list, supply is permitted only when normal quantities of water are available and government are at liberty to restrict supplies and exclude lands from the list. The lands referred to both by the MP and in the suit notice are all dry lands which have been allowed to take water only by the baling by bullock lifts. The conversion of bullock lifts into mechanical lifts was unauthorised. The use of mechanical lifts involves the draining away of available supplies, much to the detriment of owners of lands lower down who are entitled to supplies, particularly owners of registered wet lands. Complaints have in fact been made by ryots in the lower reaches that their supplies have been badly affected by the use of mechanical lifts by the ryots of upper reaches.

There is no case whatever for intervention. In the case of the Raja, Komarapalayam and Pugalur channels in the Trichi and Salem districts, the Government directed the removal of all unauthorised pumpsets. In this case also the action taken to remove the pumpsets was sound. The stay orders in respect of prosecutions for the non-removal of the pumpsets may be vacated, the prosecution allowed to proceed and the threatened suit may be awaited.<sup>128</sup>

Following representations from the tail-enders, the government directed removal of unauthorised electric and oil-engine pumpsets by the head-reach non-ayacut peasants whenever shortages arose for the tail-enders. However, the administrators failed to comply with the directive, due to the intervention of politicians, acting in favour of the farmers who were violating the existing rules and regulations on water-use in the Kalingarayan channel. Having violated the rules and regulations they had sought legal protection for the unauthorised pumpsets, and the High Court stayed the government from removing the unauthorised pumpsets. Until the judgment was delivered, the administrators were unable to implement the government order. The writ petitions of the head-reach upland farmers were dismissed by the Madras High Court in 1953.<sup>129</sup>

According to the Court,

the power to penalise irregular irrigation was incidental to the right and duty of the government to regulate supply of water from source of irrigation like in Kalingarayan channel which belonged to the Government, to ensure adequate supply of the water available for distribution to all those to whom the Government was bound to supply water, for example, to the holders of lands registered wet within the ayacut of that source of irrigation, and secondly, to those entitled to supply of water under the permits granted to them, permanent or temporary, that is, general or special. Such control and regulation of the supply of water were recognised by immemorial usage as the right and duty of the Government.<sup>130</sup>

The writ petitions were dismissed with a cost of Rs.100 each in favour of the respondents (Government). But even then, the government authorities did not remove the unauthorised pumpsets nor did the tail-end farmers press for the implementation of the court order.

The head-reach upland farmers made further attempts to regularise their unauthorised pumpsets and the non-ayacut area of the channel. The MP who supported them may have influenced the administration to keep off and not to implement the rules. Following politicisation of the water conflict in the channel, the administrators were unable to implement the orders, whether judicial or administrative.

In 1955, the government restricted installation of additional electric and oil-engine pumpsets.<sup>131</sup> However, the views of the local politicians of the ruling party were reflected in state level politics and this facilitated their entry into the government's policy. Consequently, in the same year, the government ordered that the Collector could permit installation of pumpsets where permits were previously given for bullock lifts and registered for baling wet lands in consultation with the Executive Engineer. Penalties need not be levied in these cases and any penalty imposed already should be completely reimbursed. Even the non-registered wet land holders could be allowed to install pumpsets and the Collector should regularise them at the earliest. For these also, penalty need not be levied and any penalty already levied should be completely cancelled. If more area than the permitted limit for bullock lifts were cultivated through the pumpsets the penalty amount would be imposed until such was regularised by the Collector: in such cases, the penalty amount levied should be restricted to 10 times and all penalty cases should be withdrawn.<sup>132</sup> Even afterwards, the installation of unauthorised pumpsets was neither removed nor restricted. Subsequently, the unauthorised pumpsets were further regularised in 1984.<sup>133</sup> In 1997, there were about 753 unauthorised pumpsets irrigating about 5,335 acres.<sup>134</sup> It appears that the government's policies regarding this dispute had changed due to political compulsions at the local level as well as the need to accommodate the competing demands to ensure development both in the agricultural and industrial sectors.

In most years, water supply in the old Bhavani channels, including the Kalingarayan channel, did not receive the prescribed quantity. Consequently, the availability of water supply also declined.<sup>135</sup> Yet in these circumstances, with 'water conflicts' having emerged already within the agriculture sector, the government permitted water supplies for industry. In the 1950s, Solar Industries and Traders Ltd of Punjai Lakkapuram, Erode, was permitted to pump 200,000 gallons of water per day (equivalent to about 0.4 cusec) from the Kalingarayan channel. After using this water for industrial operations, the factory had planned to utilise the same for irrigating about 30 acres of its land.<sup>136</sup> Since the tail-end farmers were already suffering due to scarcity of water as a result of installation of pumpsets by the head-reach upland farmers, the government permitted lifting of water for industrial purposes with the following conditions: 1) pumping should not be done directly from the Kalingarayan channel but through a cistern; 2) the cistern shall be supplied by a 6" diameter sluice with head wall; 3) the sill level of the sluice will be kept about one feet above the bed level of the channel; 4) the company should agree to pay the charge at the rates fixed by the government from time to time; 5) during scarcity and closure periods water would not be supplied; and 6) the company shall not change/modify any of the arrangements for pumping fixed initially.<sup>137</sup> Ultimately, the age old riparian rights of the farmers in the Kalingarayan channel were either transgressed or conveniently ignored by the government while extending irrigation under Kalingarayan channel between 1930s and 1970s. The growing demand to increase productivity through advanced technology led to water conflicts. Though the judiciary had looked at these conflicts in the light of the 1865 Act, mass representation and political intervention had brought about changes in the government policy to accommodate the process of transformation in the traditional irrigation system. The water conflicts in the Kalingarayan channel demonstrate how the government disregarded the riparian rights of the tail-end farmers to accommodate technological transformation in water lifting devices, the extension of irrigation into new areas in the head-reach and the growing demands of the industrial sector.

### III. WATER CONFLICTS IN THE LBP CANAL

The Lower Bhavani Project (LBP) dam is located on the Bhavani river just below the confluence of Moyyar, about 10 miles west of Satyamangalam town and about 23 miles north-east of Mettupalayam between 77°8' east longitude and 11°28' north latitude in Coimbatore district of Tamil Nadu. The original design of LBP was distinct from the other basins in extending irrigation mainly for dry crops, besides a small extent of wet crops. The main dry crop recommended for cultivation in half of the ayacut area in the LBP was cotton.<sup>138</sup>

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A dam across the Bhavani river was conceived by the eminent Engineer Arthur Thomas Cotton in 1834.

The general plan was to form large tanks in the Nilgris and Annamalais, to irrigate and water the entire Coimbatore district, and a large part of Malabar and throwing additional waters into the Cauvery for the improved supply to the deltas in the districts of Trichinopoly and Tanjore, and to have canal communication between the eastern and western coasts of southern India in its final stage.<sup>139</sup>

Since then various proposals were discussed at different periods viz., 1857, 1866, 1880, 1897, 1908, 1925, 1926, 1928, 1932 and 1933 but none of them was ever taken up until 1946.<sup>140</sup> Initially, a proposal for two reservoirs was discussed: the Upper Bhavani Project (UBP) for dry crops and Lower Bhavani Project (LBP) for wet crops. Ultimately, the UBP proposal was dropped in favour of the LBP in 1946.

In the 1932 proposal, the main canal was designed to be 73 miles long with a command area of 19,840 acres,<sup>141</sup> whereas, in the 1946 scheme, it was decided to extend the main canal by another 14 miles and the gross command area to 292,555 by excluding the existing wet irrigation. The actual ayacut area was confined to 207,475 acres and the remaining 85,080 acres was excluded.<sup>142</sup> About 15,170 acres in different villages was not taken up for irrigation due to two reasons: i) irrigation would harm the tobacco crop, and ii) there were a large number of wells with oil-engines in those villages.<sup>143</sup>

Prior to the LBP, the farmers of Coimbatore district mostly cultivated the rain-fed food crops cholam, cumbu, ragi, paddy; the oil seed groundnut; and the commercial crop cotton. They also raised cereals, sugarcane, fodder, orchards and gardens. The main source of irrigation was from wells, though canals, tanks and other sources were used to a small extent.<sup>144</sup> More than half of the farmers in the district were holding lands below five acres, of which only half of the area was under cultivation, indicating that most of them were engaged in subsistence agriculture.<sup>145</sup> Agriculture was mostly dependent on the seasonal rains.<sup>146</sup>

According to Vaidyanathan, structural changes in agriculture had taken place in Coimbatore district between the mid 1950s and 1960s due to the expansion of canal irrigation as well as a change in the quality of irrigation.<sup>147</sup> Vaidyanathan's study found that, 'The percentage of land area leased-out has fallen from 20.5 per cent to 3.8 per cent and that leased-in from 10.3 to 5.3 per cent, thus showing a reduction in the net area leased-out'.<sup>148</sup> He further says that hired labour had increased from 26.2 per cent to 84.9 per cent in the district for the same period.<sup>149</sup> This might be due to the fact that 'the small farmers and tenants dispossessed of their holdings have swelled into the ranks of the agricultural labourers dependent on wage employment'.<sup>150</sup>

The original idea was to stop the canal at its 89th mile and let it into Kattuvvari, a tributary of Noyyal river.<sup>151</sup> The irrigable extent of about 207,475 acres

proposed under this scheme was then localised in three taluks – 46,960 acres in Gobichettipalayam, 18,542 acres in Bhavani and 141,973 acres in Erode of Coimbatore district.<sup>152</sup>

In 1947, the farmers of Dharapuram taluk made a strong representation to the government to extend the LBP canal up to the Noyyal basin, which was frequently affected by drought and famine.<sup>153</sup> In the same year, the government decided to extend the canal and water supply to 25,000 acres in Dharapuram taluk on the right side of the Noyyal valley and curtailed an equal extent of irrigable area in the upper reaches of the LBP. This canal, known as the Dharapuram canal, extends for about thirty-five miles. The extension of the LBP canal to provide irrigation for 25,000 acres had actually brought only 20,500 acres in Dharapuram taluk; the remaining 4,500 acres fell within Karur taluk of Tiruchirappalli district.<sup>154</sup> The LBP canal was thus extended to cover the four taluks in Coimbatore district and one taluk in Tiruchirappalli district.<sup>155</sup>

Constructed mainly for irrigating dry crops, and with a length of about 124 miles, including the approach channel, the LBP was intended to irrigate about 207,000 acres. Of this, 197,000 acres was to be under dry crops, especially cotton and millets and about 10,000 acres, mostly water logged areas, under wet crops. Irrigation facilities were extended since 1952.

In September 1952, 6/2<sup>156</sup> miles from down the head of the LBP canal was opened up for irrigation to cover an extent of 5,000 acres.<sup>157</sup> In 1953/4, it was extended up to 43/2 miles for irrigating about 30,000 acres and 15,000 acres respectively for the first and second crops. In 1954/5, irrigation was extended further down to 123/3 miles with the command area being expanded up to 114,910 acres, including the area already given water supply.<sup>158</sup> From 15 September 1955, 167,400 acres which fell under the main and extension canals were opened up for irrigation. The entire canal area was supplied with water in 1956.<sup>159</sup> Since then, the water supply fluctuated every year and declined during the 1960s in the LBP canal (see Table 2). But there was a remarkable increase in the cultivation of water intensive crops between 1955/6 and 1962/3 (see Table 3). Flouting the government direction, the farmers invariably cultivated wet crops right from the opening up of the LBP canal. Even in the subsequent decade, farmers in the taluks irrigated by the LBP canal had largely cultivated water intensive crops like paddy, sugarcane and turmeric (see Appendix 1). Then, the government lifted the restrictions on water supply from one half between 1 January and 15 March for cotton crops and even millet could be raised, unless noticed, before 1 January. Following these measures, the farmers in the LBP canal area continued to raise the crops of their choice without any hindrance.

In 1958, the area under paddy cultivation had increased to 16,000 acres as against the original estimate of 10,000 acres. In the subsequent years, this had gone up to an astounding 130,000 acres by 1962.<sup>160</sup> This would become apparent

Year	Quantity (M.cu.ft)	Year	Quantity (M.cu.ft)
1954/5	19,585	1963/4	30,787
1955/6	22,381	1964/5	50,004
1956/7	27,164	1965/6	8,447
1957/8	37,584	1966/7	27,472
1958/9	37,403	1967/8	25,778
1959/60	44,991	1968/9	24,541
1960/1	43,599	1969/70	31,857
1961/2	50,414	1970/1	19,568
1962/3	47,332		

TABLE 2. Quantity of Water released in the LBP canal; 1954/5 to 1970/1.

Source: Executive Engineer, Bhavanisagar.

Year	Paddy	Cotton	Millets	Other crops	Area cultivated
1952/3	—	—	2,947	—	2,947
1953/4	1,271	1,416	4,138	2,358	9,183
1954/5	12,510	26,825	24,995	8,709	73,019
1955/6	17,190	36,015	27,971	20,737	101,913
1956/7	32,529	43,136	39,787	21,011	136,463
1957/8	61,898	29,031	44,134	53,127	188,190
1958/9	66,557	19,886	48,226	74,541	209,250
1959/60	72,797	8,989	22,489	50,141	154,416
1960/1	82,446	7,887	15,981	42,077	148,391
1961/2	115,714	3,648	16,655	45,753	181,720
1962/3	130,094	5,208	10,499	33,150	178,948

TABLE 3. Changing Cropping Pattern in the LBP Canal: 1952/53 to 1962/63.

Source: Government of India (1964) Report on Optimum Utilisation of Irrigation Potential, Lower Bhavani Project (Madras State), New Delhi: Committee on Plan Projects, 36.

Crops	Planned Originally		Existing 1959/60	
	Area (acres)	% of total	Area (acres)	% of total
Paddy	10,000	4.8	93,313	53.4
Cotton	97,000	46.9	8,778	5.0
Dry crops	100,000	48.3	72,636	41.6
<b>Total</b>	<b>207,000</b>	<b>100</b>	<b>174,727</b>	<b>100</b>

TABLE 4. Planned and existing cropping pattern in LBP in 1959/60 (in acres).

Source: Government of India (1965), *Evaluation of Major Irrigation projects – Some Case Studies*, 207.

when compared with the original proposed area (see Table 4). Due to increased wet cultivation, the operation of the project was shifted into a 'diversified dry-wet project' as against being an 'all dry' project.<sup>161</sup> In 1959, the 'seasonal sluice turn system' was introduced. Under this system, water supply was normally allowed in two separate seasons – from 15 August to 15 December and from 15 December to 15 March.<sup>162</sup> In the first season (15 August to 15 December), the farmers could raise any crop without restriction, whereas in the second season only dry crops were allowed to be irrigated. Raising of any wet crop was completely prohibited, and if cultivated it would attract a heavy penalty.<sup>163</sup> Since 1959, though cultivation of water intensive crops was prevented during the dry season, the head-reach farmers, in particular, never followed this. Although violators could be penalised by the collector, enforcement was inadequate either because of political intervention or due to administrative inefficiency. When enforced, corrupt Village Administrative Officers either made it a personal collection or reduced the penal amount.<sup>164</sup> The government, too, caved in and stopped both the levy and collection of penalties when the farmers protested.<sup>165</sup> Consequently, the area under water intensive crops area increased every year, leading to scarcity of water, particularly for the tail-end areas. Rapid expansion of paddy cultivation resulted in the farmers at the tail-end of the canal not receiving sufficient water supply.<sup>166</sup> In 1963, the government imposed a ceiling on paddy cultivation and brought it down to 60,000 acres.<sup>167</sup> One of the main reasons was that about 40–50 per cent of the ayacut area was affected by seepage; about 72 hamlets consisting of 1,488 families were affected.<sup>168</sup>

Since the entire area was planned to be irrigated according to the 'intermittent turn system', flouting of the prescribed rules and regulations by farmers of the uplands in the LBP canal ultimately led to water conflicts among the ayacutdars.<sup>169</sup>

The head-reach farmers were primarily responsible for these conflicts. They never followed the turn system, cultivated wet crops and put up cross-bunds in the canals. Consequently, the tail-end farmers were deprived of sufficient water and the intermittent turn system had also caused serious hardships to them.

In 1956, farmers of different villages in the lower reaches besides the Member of the Legislative Assembly and the Ryots Association in the LBP canal made several petitions complaining that some of the more influential landowners in the head-reaches had not allowed water to their fields as per the turn system, by violating the time schedule. Peasants from the lower reaches of the distributaries also joined the petitioners. Of the thirty-five petitions submitted during the year 1955/6, seventeen were about ryots' non-co-operation, unauthorised paddy cultivation, cross-bunding in canals and non-excavation of field bothies.<sup>170</sup> The rest (18) pertained to inadequate water supplies (see Appendix 2). Responding to about half of the petitions, the government, camouflaging the whole issue, simply stated that the problem was due to insufficient water in the LBP canal.<sup>171</sup> Hence, the turn system was abandoned and a 'zonal irrigation' system was introduced from 1959.<sup>172</sup>

When the issue came up for discussion in the Tamil Nadu Legislative Assembly, the government directed the Revenue Department to take the necessary action to prevent unauthorised paddy cultivation and illegal irrigation. It also proposed to provide the remaining sluices in the distributaries and sub-distributaries with proper shutters.<sup>173</sup> However, the lascars were not very fair in the distribution of water.<sup>174</sup> Despite the government initiating several measures for better water management, their nonexecution by lower level staff proved to be one of the main reasons for the poor water management.

Despite the insufficient quantity of water, the head-reach farmers had installed pumpsets and extended wet crop cultivation, accentuating the water conflicts in the LBP canal.<sup>175</sup> Taking into account all these factors, the government in 1955 ordered that no new electric pumpset or oil-engine should be installed for lifting water from the wells in the ayacut areas, and that no grant or loan should be sanctioned for pumpsets in the canals or wells. Farmers installing pumpsets without prior permission of the government were warned of maximum penal assessment and prosecution.<sup>176</sup> These measures were taken because between 1959 and 1963 the water table had declined steadily in the LBP areas, except in those places adjacent to the canal.<sup>177</sup>

The upland farmers raised wet and garden crops such as turmeric, tobacco and chillies. This affected the approved distribution of the project waters and supply to the regular ayacut areas, especially in the tail-end of the LBP.<sup>178</sup> In 1956, the government allowed certain concessions to the tail-end farmers of Dharapuram taluk, for installing pumpsets for lifting water from their private wells, but not directly from the government irrigation sources.<sup>179</sup> They also demanded removal of the unauthorised pumpsets used by the head-reach farmers and regulation of water supply in the appropriate manner.



The government then permitted applications for pumpsets for lifting water from the LBP canal while attaching certain conditions. In 1954, the Chief Engineer (Irrigation) agreed that the Electricity Board could provide power supply to the pumpsets in both the ayacut and non-ayacut lands in the LBP. He made a proposal containing certain conditions, including that the horse-power should not exceed more than two and that the water should be used only for dry crops.<sup>180</sup> The government instead suggested increasing it to 5 HP, stating that the horse-power limitation would not benefit the farmers. But the Chief Engineer pointed out that increasing the horse-power would adversely affect the overall irrigation interests and might induce the farmers to cultivate wet crops and other garden crops. With this comment, he finally agreed to increase the horse-power, if restricted to a fixed number of pumpsets with pumping permitted only during the non-irrigation season.

Based on the above recommendations, the Revenue Department directed the Electricity Board to supply power throughout year for lifting water from wells both in the ayacut and non-ayacut areas in the LBP, subject to the following conditions: 1) pumpsets should not exceed more than 5HP; 2) the number of pumpsets should be restricted to 200; 3) power supply should be used only for dry crops; and 4) electricity would be cut off if water were used for purposes other than that for which it has been specifically sanctioned.<sup>181</sup>

In the meanwhile, the farmers from the villages of Mettupalayam and Mangalapatti in Dharapuram taluk and Monjanur in Karur taluk submitted petitions seeking to extend electricity supply to their villages and increase the number of wells already fixed for the tail-end lands or in the ayacut. They also gave assurances that increasing the number of pumpsets would not affect the ayacut area.

The question of extending electricity connections for pumpsets in Dharapuram taluk was discussed in the Legislative Assembly in 1955. Despite the Chief Engineer's protest against any blanket increase in the number of pumpsets anywhere in the LBP area, there was a consensus for extending electricity to the villages. The Minister for Agriculture said that only certain villages were permitted to pump water.

The Chief Engineer (Irrigation) suggested that pumping from wells very near the water courses which drain themselves into the Noyyal river might be permitted in a limited way, and submitted a detailed proposal to the government. The tail-end farmers protested against these recommendations. In 1956, the government directed that power supply be granted for pumping from wells in a narrow belt of 6,300 acres in the tail-end villages of Nathakakkadiyur, Palayakottai and Muthur villages of Dharapuram taluk and Anjure village in Karur taluk. Any further increase in the number of pumpsets, the government said, would be considered only after monitoring the development of the LBP.<sup>182</sup>

In 1954, the government banned digging of new wells and deepening of existing ones in the LBP area.<sup>183</sup> However, the Community Development

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authorities actively encouraged the above and until 1956, about 549 wells were sanctioned by them.

In the LBP area, the government had restricted to 200 the number of pumpsets for lifting water from the main and extension canals.<sup>184</sup> 'Under the hire purchase scheme for oil engines and electric motor pumpsets, ryots were granted loans'.<sup>185</sup> In 1956, the Project Engineer, Erode, had sanctioned more oil engines and electric pumpsets under the 'hire purchase system' to the tune of Rs.1,220,600 (see Table 5). Installation of pumpsets was mostly financed by the farmers themselves and also through the medium-term credit provided by the co-operatives.<sup>186</sup> In fact, a large number of small farmers purchased the electric motors with the assistance of the State Co-operative Land Development Banks in Coimbatore district. For example, between 1968–1971, Rs. 40 million per year was disbursed for the purchase of electric and diesel pumpsets.<sup>187</sup>

	Oil-engines	Electric Motors	Total
Ayacut Area	345	85	430
Non-Ayacut area	53	130	183
Total	398	215	613

TABLE 5. Number of pumpsets and oil-engines in the LBP area in 1955/6.

Source: G.O.No.1401 Mis, PWD, 29 March, TNSA.

The government laid down a policy stipulating that 'no pumpset should be allowed to be installed on any of the channels in the Cauvery and Bhavani basins except under permits which could be granted only after the availability of water was ascertained and the requirements of the authorised and unauthorised pumpsets are apportioned.'<sup>188</sup> However, in 1957, the government permitted the widow of the late freedom fighter Tiruppur Kumaran<sup>189</sup> and her family members to install pumpsets for pumping water from the Pugalur channel to irrigate about 9.97 acres of land in Vengambur village of Erode taluk.

The contradictory policies adopted by the various government departments such as Co-operation, Agriculture and Electricity at different levels were also directly responsible for the water conflicts. If the higher authorities permitted certain number of pumpsets in the channel, the lower-rung officers of the same department flouted the instructions. For example, while the CE (I), Madras, ordered that no more than 200 pumpsets be installed in the LBP basin, the Project Engineer, Erode had in fact provided credit facilities for a greater number of pumpsets. In 1956, the Public Works Department Minister, who discussed these issues, had concluded that it was difficult for the government to restrict installation of oil-engines by the farmers. But he admitted that the government

should not extend loans for deepening the existing wells or encourage pumping in the ayacut area. The discrepancies within the government departments at different levels had led to unnecessary water conflicts in the LBP canal. In 1963, the government had directed the Electricity Board to adhere to certain conditions while extending power supply for pumpsets to lift water from wells in and around irrigation project ayacut areas in general. The conditions were: 1) electricity supply should not be given if the well was located within a distance of two furlongs from the canal and one furlong from the distributary; 2) The capacity of the pumpsets should not exceed more than five HP; 3) If electricity was supplied to wells within the ayacut area, water thus lifted should not be supplied outside the ayacut area; and 4) only permitted crops should be cultivated in the ayacut area. In other words, it was to ensure that the cropping-pattern remained the same.<sup>190</sup>

In 1965, the government gave exemption from the above rules to pumpsets other than those in the LBP area if water lifted from the pumps situated in the ayacut area was not used for the non-ayacut area.<sup>191</sup> In 1967, the above relaxation was extended to the LBP area but only during the off-season. Then, the government imposed certain restrictions for providing electricity connection to pump water from the existing wells in the LBP. They were: 1) Pumping should be done only from the well and not from the canal; 2) Pumping will be permitted during the off-season alone. During the irrigation season i.e., from 15 August to 14 March or as may be notified from time to time pumping will be heavily penalised; 3) To enforce condition 2, the farmers were required to enter into an agreement with the TNEB (State Electricity Board) giving consent for disconnection of the power supply during the irrigation season; 4) In the case of main and branch canals the capacity of the pumpsets should not exceed 10 HP depending upon site conditions. In the case of distributaries the capacity should not exceed 5 HP up to a distance of 50 metres and 10 HP beyond that subject to the site conditions; 5) If the well, with electricity connection, falls within the ayacut area, water should not be supplied beyond the ayacut area; and 6) Conversion of oil-engines into electric pumpsets shall also be governed by the above conditions. But this relaxation was not applicable to wells irrigating non-ayacut lands for which the original limitation of two furlongs and one furlong continued to exist.<sup>192</sup>

Installation of pumpsets in the main river and channels were permitted under these conditions: 1) pumping can generally be allowed during August to December; 2) capacity of pumpsets should not exceed 3 HP and size of the pipe also should not exceed three inches; 3) food crops only can be grown; and 4) the area should not exceed five per cent of the registered ayacut under the channel.<sup>193</sup>

In the LBP canal area, no new well could be dug or deepened within the prohibited distance of two furlongs from the main canal and those dug after 1963 were not given electricity supply. This applied to the branches and distributaries

also.<sup>194</sup> These measures were aimed at ensuring normal flow in the canal to protect the tail-end farmers.

Until the LBP canal water was used for the prescribed crops within the stipulated area of cultivation no major conflict ever arose among the farmers right from the head-reach to the tail-end, including the rich and poor as well as large and small farmholders. Conflicts cropped up following the installation of energised pumpsets and consequent extension of the area under irrigation and changing cropping pattern from dry to wet crops (mainly paddy) in the Bhavani river basin.

#### IV. CONCLUSION

Broadly, the colonial government's policies had not given due importance to the welfare of the Indian population. Although it had built a few dams, they were perhaps either individual initiatives or mostly in the expectation of higher revenue assessment. For the British had never intended to create a proper irrigation infrastructure to enhance agricultural productivity. For instance, the idea of constructing a dam across the Bhavani river which emerged in the 1830s did not materialise till the close of the colonial rule. Of course, during the post-war period, the 'Grow More Food Campaign' was introduced, under which minor irrigation schemes were promoted. In the Madras Presidency, electricity generation, which commenced at the beginning of the twentieth century, was not augmented until the end of the colonial era. The colonial administration was not concerned about effectively utilising the water resources, except with the aim of more revenue. Further, it did not encourage modern technology like pumpsets and oil-engines to extract water for agriculture. Consequently, self-sufficiency in food-grain production became the casualty during the colonial period.

After independence, extension of irrigation facilities was taken up as a prime objective to increase food-grain production by leaps and bounds. In addition, there was a thrust towards more power generation. The post-independence government encouraged irrigation and its related inputs such as electricity, oil-engines and electric pumpsets, credit facilities and hybrid seeds – which had never been given priority by the colonial government.

Until the early twentieth century (1930s), in the Bhavani river basin water was not diverted either for agricultural or for domestic and industrial purposes except for the three diversions in the old channel established during the pre-colonial period, viz., Arakkankottai, Thadappalli and Kalingarayan. In the 1930s, water was diverted to meet the domestic demands of Coimbatore city from the Siruvani river, a tributary of Bhavani. In 1931, 2.5 million gallons of water per day was diverted to Coimbatore city from Siruvani river, and this had gone up to 2.9 million gallons per day in 1971. The quantity had further increased

to 8.5 million gallons per day by 1976.<sup>195</sup> In addition, water was diverted to Tiruppur in 1962 from the Bhavani river at Mettupalayam and subsequently to 65 wayside village panchayats.<sup>196</sup> Water was also diverted from the Bhavani river to the Noyyal river basin<sup>197</sup> and to some extent for the railways and other industries. These diversions have been a prime cause for the different kinds of conflicts since the early twentieth century.<sup>198</sup> For example, for the 752 or more dyeing and bleaching units in Tiruppur city, 13 million gallons per day of groundwater was transported from the nearby rural areas through truck-tankers.<sup>199</sup> In addition to the increasing consumption by the domestic and industrial sectors, there was a growing demand for water within the agricultural sector, due to more area being brought under irrigation, changing cropping-pattern, mechanisation of agriculture and other technological transformations over the period.

The close of the colonial era witnessed the process of technological transformation taking roots in the old Kalingarayan channel through the gradual replacement of traditional water lifting devices by electric and oil-engine pumpsets. Besides transforming the dynamics of farm operations, the change in water lifting devices in the channel and the river led to water conflicts in the Kalingarayan channel of the Bhavani river basin during the second half of the twentieth century. From the beginning of the post-colonial period, phenomenal changes had taken place in the LBP canal, in terms of area under irrigation, changing cropping-pattern, installation of pumpsets and oil-engines etc., which exacerbated the conflicts.

It is notable that the rules and regulations framed by the government at a given time were modified or changed over the period in tune with the process of transformation emerging within the agrarian system as well as in the other sectors of the economy. Political intervention has also had a cascading effect on conflict management over water disputes. The rich and large farmers attempted to legitimise their illegal farming operations with the connivance of the politicians and by dragging the issues to the courts. Politicisation further made it difficult for the authorities to enforce the regulations, thus creating grave disadvantages to those sections of farmers who lacked political patronage.

Politics played an important role both in the planning of the scheme and in water management. Apart from supporting those violating the prevailing rules, the politicians have also made strong representations about the farmers' 'grievances' to the government to effect policy changes. The political leaders who represented the farmers' problems were biased in favour of their own regions, community, relatives, party workers and sympathisers. Though the tail-end farmers also belonged to the assembly segments of his parliamentary constituency, the MP undermined their legitimate interests, since those assembly segments were represented by legislators of rival political parties. Finally, politicians of the ruling party obviously enjoyed an upper hand in influencing the policy decisions concerning water management.

This study clearly shows that riparian rights of the farmers were not considered by the government while attempting to accommodate the ever-increasing demand for water from various sectors. All the more, it is appalling to see that the legal system is not coherent and in tune with the dynamic process of transformation in the agrarian system as well as in the other sectors of the economy. Transformation and attendant conflicts in the LBP emerged around the 1940s, but the judiciary had viewed these problems in the light of the Irrigation Cess Act of 1865. Successive governments and the political leadership, unable rise above their myopic vision, never foresaw the issues and responded only belatedly. The state came up with only knee-jerk reactions and betrayed a lack of a sustainable policy to address the competing demands arising out of the dynamic process of economic transformation. Analysis of the water conflicts in a historical perspective has also exposed the limitations of the legal system in accommodating the process of transformation and the vested interests behind political intervention which always favoured a particular region and caste. Such factors have paved the way to the deepening the crisis in the developing countries.

#### ABBREVIATIONS

BOR – Board of Revenue  
 CE(I) – Chief Engineer (Irrigation)  
 CPI – Communist Party of India  
 GO – Government Order  
 HP – Horse Power  
 IPC – Indian Penal Code  
 LBP – Lower Bhavani Project  
 MLA – Member of Legislative Assembly  
 MP – Member of Parliament  
 PWD – Public Works Department  
 PW & L – Public Works and Labour Department  
 TNEB – Tamil Nadu Electricity Board  
 UBP – Upper Bhavani Project

#### NOTES

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<sup>1</sup> Burns and Meinzen-Dick 2000, 23–41; World Bank 1991, 16; Saravanan 1998; Spiertz 2000, 162–99; Kusnial et al. 2000, 292–314.

<sup>2</sup> Burns and Meinzen-Dick 2000, 42–3; Gyawali and Dixit 1999, 52–122.

<sup>3</sup> Brewer 2000, 112–36.

<sup>4</sup> Meinzen-Dick 2000, 245–68; Sadeque 2000, 269–91; Sutawan 2000, 315–36.

<sup>5</sup> Saravanan 1998; World Bank 1991.

<sup>6</sup> World Bank 1991, 16.

<sup>7</sup> Rathore and Mathur 1999, 262; Moench 1999, 36; Mariasusai 1999, 1.

<sup>8</sup> Dinesh Kumar et al. 1999, 194.

<sup>9</sup> *Ibid.*, 192.

<sup>10</sup> Burns and Meinzen-Dick 2000.

<sup>11</sup> Guhan 1993; Folke 1998, 348; 2000, 47; World Bank 1991, 128.

<sup>12</sup> Guhan 1993.

<sup>13</sup> Saravanan and Appasamy 1999, 161–90.

<sup>14</sup> Chambers 1988, 21–2; Folke 1988, 341; MIDS 1998, 51; Vaidyanathan 1994, 55; Mariasusai 1999, 20.

<sup>15</sup> Wade 1980a, 359.

<sup>16</sup> Wade 1975a, 303.

<sup>17</sup> Government of India 1964, 8; Wade 1975a, 303; 1980b, A-109.

<sup>18</sup> Gorter 1989, A-101; Wade 1980a, 359; Mollinga 1998, 57.

<sup>19</sup> Wade 1979a, 14–17; Blomqvist 1996, 99.

<sup>20</sup> Wade 1987.

<sup>21</sup> Mariasusai 1999, 25–30.

<sup>22</sup> Mosse 1997a, 53.

<sup>23</sup> Gorter 1989, A-102.

<sup>24</sup> Wade 1975a, 316.

<sup>25</sup> Gorter 1989, A-102; Bharadwaj 1990, 36.

<sup>26</sup> MIDS 1986, 119; Mosse 1997a, 4.

<sup>27</sup> Mosse 1997a, 9.

<sup>28</sup> Folke 1998, 341; MIDS 1996, 119.

<sup>29</sup> Folke 1998, 348.

<sup>30</sup> *Ibid.*, 349.

<sup>31</sup> Mosse 1997, 58.

<sup>32</sup> Rajagopal 1991, 245.

<sup>33</sup> Bharadwaj 1990, 4.

<sup>34</sup> Wade 1975b, 1743; 1979a, A-155; 1979b, 14; 1980a, 359–77; 1980b, A-109; 1980b, A-147–60; 1982a, 287–328; 1982b, 1606; 1985, 467–97.

<sup>35</sup> Wade 1975b.

<sup>36</sup> Folke 1998, 345.

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- <sup>37</sup> Government of India 1964, 15; Folke 1998, 345–6; Mariasusai 1999, 7.
- <sup>38</sup> Mollinga 1995, 226.
- <sup>39</sup> Mollinga 1998, 57.
- <sup>40</sup> Mariasusai 1999, 22.
- <sup>41</sup> Schultz 1964, 132–3.
- <sup>42</sup> Desai 1987, 1756.
- <sup>43</sup> Tamil Nadu Electricity Board 1976/7, 5.
- <sup>44</sup> Sonachalam 1968, 27–8.
- <sup>45</sup> Hanumantha Rao 1972, 393.
- <sup>46</sup> Clark 1970, 130; Dhawan 1979, A-152.
- <sup>47</sup> Vassart 1981, 38–40.
- <sup>48</sup> Vaidyanathan 1999, 19; Rao 1967, 151.
- <sup>49</sup> MIDS 1998, 42.
- <sup>50</sup> Sonachalam 1968, 92.
- <sup>51</sup> By 1978 there were 708,339 tube-wells (Byres 1981, 420).
- <sup>52</sup> Tamil Nadu Electricity Board 1976/7, 34.
- <sup>53</sup> Cartillier 1975, 1732.
- <sup>54</sup> Though the cost of irrigation per unit was low, the initial investment is high to install pumpsets. For instance, the total investment per pumpset varied from Rs.3, 100 to Rs.4, 650 per well to Rs.7, 400 to Rs.14, 575. Of this, the major investment on machinery varied from Rs.2, 800 to Rs.3, 800 per pumpset and this variation was mainly due to the model, year of purchase, etc and the investment on civil structure varied from Rs.100 to Rs.1, 150 (Maddappa et al. 1970, 22).
- <sup>55</sup> Cartillier 1975, 1739.
- <sup>56</sup> Sonachalam 1968, 194.
- <sup>57</sup> Madappa et al. 1970, 23.
- <sup>58</sup> Gustafsson 1979, 1127.
- <sup>59</sup> Desai 1987, 1753.
- <sup>60</sup> Cartillier 1975, 1741.
- <sup>61</sup> Vaidyanathan 1978, 92.
- <sup>62</sup> Palanisami 1984, 17.
- <sup>63</sup> Singh 1995, 174.
- <sup>64</sup> *Ibid.*, 176.
- <sup>65</sup> Janakarajan 1999, 127; Moench 1995, 1; Sharma 1995, 10; Singh 1995, 175; Desai 1993, 8.
- <sup>66</sup> Moench 1998, A-48.
- <sup>67</sup> Singh 1990, 50.
- <sup>68</sup> Sharma 1995, 10–11.
- <sup>69</sup> Sengupta 1985, 1929. For example, in Puliampatty village, the spinning mill owners established twenty borewells each about 1000 feet in ten acres of land. Consequently, the adjacent poor farmers' cultivated lands got dried up and became desertified (MIDS 1998, 39).
- <sup>70</sup> Bharadwaj 1990, 16.
- <sup>71</sup> Clark 1970, 71; 1954, 28; Rao 1993, A-129; Janakarajan 1997, 56.
- <sup>72</sup> Jose 1984, A-99.
- <sup>73</sup> Reidinger 1980, 264–83.
- <sup>74</sup> Bharadwaj 1990, 51.



<sup>75</sup> At Kodiveri anicut, two irrigation channels take off on either side of the river. The right side channel, known as Tadappalli channel, irrigates about 16, 840 acres of wet crops, while the left side channel, called as the Arakkankottai channel, irrigates about 6, 895 acres.

<sup>76</sup> Rasu 1987, 44–9.

<sup>77</sup> Government of Madras 1965, 29.

<sup>78</sup> Moench 1998, A-46.

<sup>79</sup> Singh 1991, 33.

<sup>80</sup> Sengupta 2000, 3.

<sup>81</sup> Government Order (hereafter G.O) No.4796 Mis, Public Works Department, 29 Dec.1953, Tamil Nadu State Archives, Chennai (hereafter TNSA).

<sup>82</sup> Baliga 1960, 203.

<sup>83</sup> Folke 1998, 346; 2000, 48; Mosse 1999, 309; Reddy 1990, 1047; Arundel 1879.

<sup>84</sup> A water-way constructed in the bunds of tanks to permit the flow of surplus water, so as to prevent the breach of bunds.

<sup>85</sup> Dalyell 1971, 41–2.

<sup>86</sup> Maclean 1885; Mosse 1997a, 28.

<sup>87</sup> Sengupta 1985, 1923.

<sup>88</sup> Vaidyanathan 1992, 8; Sivasubramaniyan 1995, Appendix 4.1; 1998, 267.

<sup>89</sup> Vaidyanathan 1992, 8–10; MIDS 1986, 129.

<sup>90</sup> Sivasubramaniyan 1995, 141; 1997, 358; 1998, 265; 2000; Vani 1992, 8; Folke 1998, 346; Mosse 1999, 307; Reddy 1990, 1047; Ratnagar 1989, 2359. Baliga had briefly discussed the history of irrigation management in the Madras Presidency since the colonial government's control over the *Kudimaramattu* system and how it got disintegrated under the British rule (Baliga 1960, 199–208; see also Krishnaswami 1947, 97–102).

<sup>91</sup> Mosse 1997a, 10.

<sup>92</sup> *Ibid.*, 57–8.

<sup>93</sup> Jose 1984, A-99.

<sup>94</sup> Sengupta 1985, 1925.

<sup>95</sup> This is a contrivance for drawing water from the well, channel and lower levels.

<sup>96</sup> Letter from the Collector, Coimbatore, to the Secretary to Government through the Board of Revenue, 22 Jul.1953, TNSA.

<sup>97</sup> *Ibid.*

<sup>98</sup> Turn system means that the branches and sluices supplying water to the fields turn off and on to suit the requirements and the period of supply. All the major distributaries were run continuously while the sluices and branches will work on turns. For instance, water supply allowed in the branches and sluices for five days for irrigating an area would then be stopped for the subsequent five days.

<sup>99</sup> G.O.No.32 I Mis, PW & L, 1936, TNSA.

<sup>100</sup> At present about 800 pumpsets exist in this channel (MIDS 1998, 54).

<sup>101</sup> Folke 2000, 72.

<sup>102</sup> Mariasusai 1999, 21.

<sup>103</sup> The tail-end villages are Kodumudi, Chinnasamudram, Nagamanicken Palayam, Vadakkupudupalayam, Pallakattuputhur and Avdayapalayam.

<sup>104</sup> The upland head-reach villages are: Pasur, Modakurichi, Kolanalli, Kilambadi, Malayampalayam, Swaminathapalayam, Punjai Kalamangalam, Kolathur Palayam,

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Pachapalayam, Sanar Palayam, Alunthapalayam, Komaraswamigoundan Palayam, Kuttapalayam, Palanigoundan Palayam, Erode and Mettur.

<sup>105</sup> Petition from the Farmers of Chennasamudram, Nagamanicken palayam and Avadayarai villages in Erode taluk to the Minister of Revenue, Government of Madras, dated 6 Jul. 1953, TNSA.

<sup>106</sup> It means that the farmers have to get permission from the local officers to use the water resources for which they have to pay. If they used water without getting permission, they will be penalised by the government.

<sup>107</sup> Letter from B.V.Viswanatha Aiyar, Advocate to the Chief Secretary, State of Madras and the Collector of Coimbatore, 30 Apr. 1953, TNSA.

<sup>108</sup> Tax on land or land-rent.

<sup>109</sup> Letter from B.V.Viswanatha Aiyar, Advocate to the Chief Secretary, State of Madras and Collector of Coimbatore, 30 Apr. 1953, TNSA.

<sup>110</sup> Dalyell 1971, 7.

<sup>111</sup> Board of Standing Order (4) Appendix – H.

<sup>112</sup> MIDS 1994, 5.

<sup>113</sup> Letter from the Collector, Coimbatore, to the Secretary to the Government through the Board of Revenue, 22 Jul. 1953, TNSA.

<sup>114</sup> According to Article 226: 'Notwithstanding anything in article 32, every High Court shall have power, throughout the territories in relation to which it exercises jurisdiction, to issue to any person or authority, including in appropriate cases any Government, within those territories directions, orders or writs, including writs in the nature of habeas corpus, mandamus, prohibition, quo warranto and certiorari, or any of them, [for the enforcement of any of the rights conferred by part III and for any other purpose]'.<sup>115</sup>

<sup>115</sup> Writ Petition Numbers 473 and 475 of 1953, Madras High Court, Chennai.

<sup>116</sup> Politicians and political parties played a prominent role in resolving the conflicts between the government and peasants. For instance, most of the pumpset-farmers had not paid electricity charges during 1970s and 80s demanding reduction in power tariff. When the Electricity Board initially imposed surcharges and later disconnected power supply, the peasant organisations and the opposition parties demanded that the government withdrawn the hike. During the elections, all parties invariably assured in their manifestos that, if voted to power, the surcharges would be withdrawn (Rajagopal & Anbazhagan 1989, 341–2).

<sup>117</sup> The backward goundar community is the dominant caste, having enormous political clout, in north-west Tamil Nadu. The goundars, mostly landed gentry, have huge land holdings.

<sup>118</sup> Mariasusai 1999.

<sup>119</sup> The names and caste of the petitioners (475 of 1953) are as follows: K.Sengodu Goundar, K.S.Sellakumaraswami Goundar, S.P.Muthusami Goundar, S.P.Subbaraya Goundar, V.L.Ramalinga Goundar, L.K.Kuppusamy Goundar, M.Muthusami Goundar, K.C.Sriranga Goundar, K.C.Rangaswami Goundar, A.V.Muthusami Goundar and K.M.Venugopala Pillai.

All the four who filed the other petition (473 of 1953), belonged to the Same Goundar caste: Sengodu Goundar, K.S.Sellakumaraswami Goundar, K.S.Sengappa Goundar, and K.S.Pambana Goundar.

<sup>120</sup> Mariasusai 1999.

<sup>121</sup> Ibid.

<sup>122</sup> The upland villages are: Pasur, Modakurichi, Kolanalli, Kilambadi, Malayampalayam, Swaminathapuram, Kolathurpalayam, pachapalayam, Aluthupalayam and Mettur.

<sup>123</sup> Petition from K.Periyasamy Gounder, Member of Parliament to the Ministry of Finance & Food, Ministry of Revenue, Ministry of Prohibition, 18 Apr.1953, TNSA.

<sup>124</sup> Erode, Palanigoundanpalayam, kuttapalayam, Sanarpalayam, Punjai Kolamangalam, Mettur, Kolathupalayam, Komarswamigoundam palayam, Aluthupalayam and swaminathapuram.

<sup>125</sup> It consists of the list of farmers who had customary rights to use the channel water.

<sup>126</sup> Letter from B.V.Viswanatha Aiyar, Advocate to the Chief Secretary, State of Madras and the Collector of Coimbatore, 30 Apr.1953, TNSA.

<sup>127</sup> Letter from the Collector, Coimbarore, to the Secretary to Government through the Board of Revenue, 22 Jul.1953, TNSA.

<sup>128</sup> G.O.No.4796, PWD, 29 Dec.1953, TNSA.

<sup>129</sup> Writ Applications Numbers 473 & 475 of 1953, Madras High Court, Chennai.

<sup>130</sup> High Court Writ Applications Numbers. 473 and 475 of 1953, Chennai.

<sup>131</sup> G.O.No.56, Mis, PWD, 6 Jan.1955, TNSA.

<sup>132</sup> G.O.No.3727 Mis PWD, 1 Sep.1956, TNSA.

<sup>133</sup> Rasu 1987, 107.

<sup>134</sup> MIDS 1998, 26.

<sup>135</sup> Government of India 1964, 32.

<sup>136</sup> G.O.No.4801 Mis, PWD, 26 Nov.1951, TNSA.

<sup>137</sup> Ibid.

<sup>138</sup> Government of Madras 1965, 31.

<sup>139</sup> Atchi Reddy 1990, 620.

<sup>140</sup> Government of Madras 1948, 1–2.

<sup>141</sup> Government of India 1965, 203.

<sup>142</sup> About 44, 993 acres unfit for cultivation; 3, 764 acres reserved for community purposes; land owners of 15, 170 acres were not willing to take up irrigation; 9, 029 acres isolated lands and lands required to occupy the distributory system and 12, 124 acres excluded due to thir elevation etc (Government of India 1965, 204; Government of Madras 1948, 41).

<sup>143</sup> Government of India 1965, 205.

<sup>144</sup> For instance, in 1945/6, the total cropped area in Coimbatore district was 2,108,534 acres, of which, paddy accounted for 133,529 acres, cholam 452,870 acres, cumbu 265,738 acres, ragi 162,938 acres, maize 474 acres, bengalgram 2,490 acres, other foodgrains, including pulses 411,368 acres, oilseeds 235,350 acres, condiments and spices 22,330 acres, sugar products 11,906 acres, cotton 299,044 acres, fodder crops 2,497 acres, orchards and garden products 16,771 acres and other miscellaneous non-food crops 90,198 acres. Of the total cropped area, 563,482 acres were irrigated. Of this, 420,434 acres were under wells, 88,613 acres under canal, 19,240 acres under tanks and 35,195 acres from other sources (Census of India 1961, 986).

<sup>145</sup> Duraiswami et al. 1954, 358.

<sup>146</sup> Government of Madras 1965, 7.

<sup>147</sup> Vaidyanathan 1978, Jose 1984, 1984.

<sup>148</sup> Vaidyanathan 1978, 97.

<sup>149</sup> Ibid., 95–6.

<sup>150</sup> Jose 1984, A-102.

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- <sup>151</sup> Government of Madras 1966, 35.
- <sup>152</sup> *Ibid.*, 165.
- <sup>153</sup> *Ibid.*, 14.
- <sup>154</sup> *Ibid.*, 14 and 35.
- <sup>155</sup> 40,500 acres in Gobichettipalayam taluk; 17,000 acres in Bhavani taluk; 125,000 acres in Erode taluk of Coimbatore district and 20,600 acres in Karur taluk of Tiruchirappalli district (Government of Madras 1966, 167)..
- <sup>156</sup> Six miles and two furlongs.
- <sup>157</sup> Government of Madras 1965, 51.
- <sup>158</sup> G.O.No.53, Mis, PWD, 4 Jan.1956, TNSA.
- <sup>159</sup> Government of Madras 1966, 16 and Government of India 1964, 1.
- <sup>160</sup> G.O.No.2367, Mis, Revenue, 21 Sep.1964, TNSA.
- <sup>161</sup> G.O.No.2367 Revenue, 21 Sep.1964, TNSA.
- <sup>162</sup> *Ibid.*
- <sup>163</sup> *Ibid.*
- <sup>164</sup> Blomqvist 1996, 88.
- <sup>165</sup> Government of India 1965, 207.
- <sup>166</sup> Palanisami 1984, 25.
- <sup>167</sup> G.O.No.2843 Mis, Revenue, 21 Sep.1963, TNSA.
- <sup>168</sup> Government of India 1965, 207.
- <sup>169</sup> It means that ‘the ayacut under the sluices situated in the odd miles of the canal were to be irrigated for five days and for the next five days water was to be provided for the ayacut under the sluices in the even miles of the canal’ (Government of India 1965).
- <sup>170</sup> The water from the main canal and distributaries is conveyed to the fields for irrigation purposes through small irrigation channels called field bothies. For the purpose of definition, all water courses irrigating an extent of less than 150 acres could be described as field bothies. It is also classified as ryot’s bothies or government bothies depending upon the managing agency.
- <sup>171</sup> G.O.No.2049, Mis, PWD, 30 Apr.1956, TNSA.
- <sup>172</sup> Palanisami 1984, 25.
- <sup>173</sup> G.O.No.2049 Mis, PWD, 30 Apr.1956, TNSA.
- <sup>174</sup> Government of India 1965:215.
- <sup>175</sup> MIDS 1998, 35–6.
- <sup>176</sup> G.O.No.3300 Mis, PWD, 27 Aug.1955, TNSA.
- <sup>177</sup> Government of India 1964, 39–42; Gordh and Kwick 1981, 5; Swaninathan 1989, 5–10.
- <sup>178</sup> Go.No. 1401 Mis, PWD, 29 Mar.1957, TNSA.
- <sup>179</sup> G.O.No.4722, Revenue, 28 Dec.1954, TNSA.
- <sup>180</sup> G.O.No.3559 Mis, PWD, 12 Oct.1954, TNSA.
- <sup>181</sup> G.O.NO.486, PWD, 11 Feb.1955, TNSA.
- <sup>182</sup> G.O.No.668 Mis, PWD, 10 Feb.1956, TNSA.
- <sup>183</sup> G.O.No.3015 Revenue, 19 Oct.1954, TNSA.
- <sup>184</sup> G.O.No.1401 Mis, PWD, 29 Mar.1957, TNSA.
- <sup>185</sup> Rao 1967, 151.
- <sup>186</sup> *Ibid.*
- <sup>187</sup> Cartillier 1975, 1735.
- <sup>188</sup> G.O.No.3426 Mis, PWD, 24 Oct.1957, TNSA.

<sup>189</sup> N.Kumaraswami, alias Kumaran was one of the freedom fighters from Tamil Nadu. He participated in the satyagraha procession with the Congress flag which was notified as unlawful by the police. When he refused to give up the flag he was targeted and murdered in police action, involving indiscriminate caning. In Tamil Nadu he is popularly known as 'Tiruppur Kumaran'.

<sup>190</sup> G.O.No.838 Mis, PWD, 15 Mar.1963, TNSA.

<sup>191</sup> G.O.No.2552 Mis, PWD, 4 Sep.1965, TNSA.

<sup>192</sup> G.O.No.2259 Mis, PWD, 3 Nov.1967 and G.O.No.2260 Mis, PWD, 3 Nov.1967, TNSA.

<sup>193</sup> G.O.No.3365 Mis, PWD, 10 Oct.1957, TNSA.

<sup>194</sup> Letter from Executive Engineer, PWD, Erode Division to the Suprintanting Engineer, PWD, Coimbatore-Nilgiris Circle, Coimbatore, 20 Sep.1979, TNSA.

<sup>195</sup> Saravanan 1999, 21.

<sup>196</sup> Saravanan 1998 and 1999.

<sup>197</sup> Saravanan 1998, 27–33.

<sup>198</sup> Saravanan and Appasamy 1999, 161–90.

<sup>199</sup> Appasamy 1994.

## BIBLIOGRAPHY

[Unless mentioned otherwise Government Orders and other letters were consulted at the Tamil Nadu State Archives, Chennai. Writ petitions were referred at the High Court, Chennai]

Appasamy, P. 1994. 'Sharing Common Water Resources: Urban Study – A Review'. Background Paper for Policy Advisory Committee Meeting, Chennai: Madras Institute of Development Studies.

Arundel, A.T 1879. *Irrigation and Communal Labour in the Madras Presidency*. Madras: Lawrence Press.

Atchi Reddy, M. 1990. 'Travails of an Irrigation Canal Company in South India: 1857–1882', *Economic and Political Weekly*, Vol.XXV, No.12, 619–28.

Baliga, B.S. 1960. *Studies in Madras Administration*, Vol.II. Madras: Government of Madras.

Bharadwaj, Krishna 1990. *Irrigation in India: Alternative Perspectives* (Monograph). New Delhi: Indian Council of Social Science Research.

Blomqvist, Anna 1996. *Food and Fashion: Water Management and Collective Action Among Irrigation Farmers and Textile Industrialists in South India*. Department of Water and Environmental Studies, Linkoping: Linkoping University.

Brewer, Jeffrey D. 2000. 'Negotiating Seasonal Water Allocation Rules in Krindi Oya, Sri Lanka' in *Negotiating Water Rights*, ed. B.R. Burns and R.S. Meinzen-Dick. New Delhi: Vistaar Publications.

Bruns, Bryan Randolph and Meinzen-Dick, Ruth S. 2000. 'Negotiating Water Rights: Implications for Research and Action', in *Negotiating Water Rights*, ed. B.R. Burns and R.S.Meinzen-Dick. New Delhi: Vistaar Publications.

## WATER CONFLICTS IN TAMIL NADU

- Byres, T.J. 1981. 'The New Technology, Class Formation and Class Action in the Indian Countryside', *The Journal of Peasant Studies*, Vol.8, No.4, 405–54.
- Cartillier, Michel 1975. 'Role of Small-Scale Industries in Economic Development: Irrigation Pumpsets Industry in Coimbatore', *Economic and Political Weekly*, Vol.X, Nos. 44 & 45, 1732–41.
- Census of India 1961; 1964. *District Census Handbook, Coimbatore* Vol.II. Madras: Superintendent of Census Operations.
- Chambers, R. 1988. *Managing Canal Irrigation: Practical Analysis from South Asia*. Cambridge: Cambridge University Press.
- Clark, Colin 1954. *The Economics of Irrigation in Dry Climates*. Oxford: University of Oxford.
- Clark, Colin 1970. *The Economics of Irrigation*. Oxford: The English Language Book Society and Pergamon Press.
- Dalyell, R.A. 1971. *The Standing Orders of the Board of Revenue from 1820 to 1870*, III edition, Madras: Higginbothams and Co.
- Dandekar, V.M. 1966. 'Transforming Traditional Agriculture: A Critique of Professor Schultz', *Economic and Political Weekly*, Vol.1, No.1, 25–36.
- Desai, Ashok.V. 1987. 'The Indian Electric Power System', *Economic and Political Weekly*, Vol.XXII, No.41, 1753–61.
- Desai, C.G. 1993. 'Critical Issues of Groundwater Development and Management in India – Remedial Measures Thereon', in *Water Management: India's Groundwater Challenge*, ed. Marcus Moench. Ahmedabad: VIKSAT-Pacific Institute Collaborative Groundwater Project.
- Dasgupta, Subhendu 1981. 'Transnational Corporations in Electric Power Sector, 1947–1967: Continuity of Linkages', *Economic and Political Weekly*, Vol.XVI, Nos.28–29, 1189–1204.
- Dawan, B.D. 1979. 'Trends of Tubewell Irrigation, 1951–1978', *Economic and Political Weekly*, Vol.XIV, Nos.51 and 52, A-143–A-154.
- Dinesh Kumar, M; Chopde, Shashikant; Mudrakarthas, Srinivas and Prakash, Anjal 1999. 'Addressing Water Scarcity: Local Strategy for water supply and Conservation Management in the Sabarmathi basin, Gujarat', in *Rethinking the Mosaic: Investigations into Local Water Management*, ed. Marcus Moench, Elisabeth Caspari and Ajaya Dixit, 191–246. Kathmandu: Nepal Water Conservation Foundation and Boulder: Institute for Social and Environmental Transition.
- Duraisami, V; Meenakshisundram, K and Narasimhan, V.S. 1954. 'Rural Economic Conditions of Coimbatore District', *The Madras Agricultural Journal*, Vol.XLI, No.10, 357–66.
- Folke, Steen 1998. 'Conflicts over Water and Land in South Indian Agriculture: A Political Economic Perspective', *Economic and Political Weekly*, Vol.XXXIII, No.7, 341–9.
- Folke, Steen 2000. 'Conflicts over Water for Irrigation in the Cauvery delta, South India – Some Institutional Implications', *Journal of Social and Economic Development*, Vol.III, No.1, 42–75.
- Gordh, Atos and Kvick, Per 1981. *Study of Design of Small Reservoir (Tank) for Recharging Purposes*. Stockholm.

- Gorter, Pieter 1989. 'Canal Irrigation and Agrarian Transformation: The case of Kesala', *Economic and Political Weekly*, Vol.XXIV, No.39, A.94–104.
- Government of India 1952. *The First Five Year Plan*. New Delhi: Planning Commission.
- Government of India 1964. *Report on Optimum Utilisation of Irrigation Potential: Lower Bhavani Project (Madras State)* New Delhi: Committee on Plan Projects.
- Government of India 1965. *Evaluation of Major Irrigation Projects: Some case studies Programme Evaluation Organisation*. New Delhi: Planning Commission.
- Government of Madras 1948. *Report on the Lower Bhavani Project (1946 scheme)*. Madras: Government Press.
- Government of Madras 1965. *History of the Lower Bhavani Project, Vol.I – Head works*. Madras: Government Press.
- Government of Madras 1966. *History of the Lower Bhavani Project, Vol.II – Canals*. Madras: Government Press.
- Guhan, S. 1993. *The Cauvery River Dispute: Towards Conciliation*. Madras: Frontline Publishers.
- Guillet, David 2000. 'Water Property Rights and Resistance to Demand Management in Northwestern Spain', in *Negotiating Water Rights*, ed. B.R. Burns and R.S. Meinzen-Dick. New Delhi: Vistaar Publications.
- Gustafsson, Hans 1979. 'Electricity for Development: Problems and Prospects in Equipment Acquisition', *Economic and Political Weekly*, Vol.XIV, No.27, 1127–31.
- Gyawali, Dipak and Dixit, Ajaya 1999. 'Fractured Institutions and Physical Interdependence: Challenges to local water management in the Tinau river basin, Nepal' in *Rethinking the Mosaic: Investigations into Local Water Management*, ed. Marcus Moench, Elisabeth Caspari and Ajaya Dixit, 57–122. Kathmandu: Nepal Water Conservation Foundation and Boulder: Institute for Social and Environmental Transition.
- Hanumantha Rao, C.H. 1972. 'Farm Mechanisation in a Labour-Abundant Economy', *Economic and Political Weekly*, Vol.VII, No.56 &57, 393-400.
- Janakarajan, S. 1997. 'Consequences of Aquifer Over-Exploitation: Prosperity and Deprivation', *Review of Development and Change*, Vol.II, No.1, 24–51.
- Janakarajan, S. 1999. 'Conflicts over the Invisible Resource in Tamil Nadu: Is there a way out?', in *Rethinking the Mosaic: Investigations into Local Water Management*, ed. Marcus Moench, Elisabeth Caspari and Ajaya Dixit, 123–59. Kathmandu: Nepal Water Conservation Foundation and Boulder: Institute for Social and Environmental Transition.
- Jose, A.V. 1984. 'Farm Mechanisation in Asian Countries: Some Perspectives', *Economic and Political Weekly*, Vol.XIX, No.26, A-97–103.
- Krishnaswami, S.Y. 1947. *Rural Problems in Madras* (Monograph). Madras: Government of Madras.
- Kurnia, Ganjar; Avianto, Teten W. and Burns, B.R. 2000. 'Farmers Factories and the Dynamics of Water Allocation in West Java', in *Negotiating Water Rights*, ed. B.R. Burns and R.S. Meinzen-Dick. New Delhi: Vistaar Publications.
- Maclean, C.D. 1885. *Glossary of the Madras Presidency*. Madras: Government Press
- Madappa, P.P.; Patel, K.V. and Patel, N.T. 1970. 'Investment Decisions on Pumpsets: A case Study of a Saurashtra Village', *Economic and Political Weekly*, Vol.V, No.1, 21–5.

## WATER CONFLICTS IN TAMIL NADU

- Madras Institute of Development Studies (MIDS) 1986. *Tank Irrigation in Tamil Nadu: Some Macro and Micro Perspectives*. Madras: MIDS.
- Madras Institute of Development Studies (MIDS) 1994. *Sharing Common Water Resources*. Madras: MIDS.
- Madras Institute of Development Studies (MIDS) 1998. *Stakeholders Meeting on Management of Water Conflicts in the Bhavani and Noyyal River Basins*. Chennai: MIDS.
- Madras Institute of Development Studies (MIDS) 1998. *National Resource Accounting for Water Resources in the Bhavani Basin – Phase II (Interim Report)*. Chennai: MIDS.
- Mariasusai, S. 1999. *Conflicts over the use of Surface water in the Lower Bhavani Basin in Tamil Nadu*. Chennai: Madras Institute of development Studies.
- Meinzen-Dick, Ruth S. 2000. 'Public, Private, and Shared Water: Groundwater Markets and Access in Pakistan', in *Negotiating Water Rights*, ed. B.R. Burns and R.S. Meinzen-Dick. New Delhi: Vistaar Publications.
- Moench, Marcus et al. 1993. *Water Management: India's Groundwater Challenge*. Ahmedabad: VIKSAT-Pacific Institute Collaborative Groundwater Project.
- Moench, Marcus (ed.) 1995. *Groundwater Law: The Growing Debate*. Ahmedabad: VIKSAT-Pacific Institute Collaborative Groundwater Project.
- Moench, Marcus 1998. 'Allocating the Common Heritage: Debates over Water Rights and Governance Structure in India', *Economic and Political Weekly*, Vol. XXXIII, No.26, A-46–53.
- Moench, Marcus 1999. 'Addressing Constraints in complex systems: meeting water management needs of South Asia in the 21st Century', in *Rethinking the Mosaic: Investigations into Local Water Management*, ed. Marcus Moench, Elisabeth Caspari and Ajaya Dixit, 1–56. Kathmandu: Nepal Water Conservation Foundation and Boulder: Institute for Social and Environmental Transition.
- Mollinga, Peter P. 1995. 'Constituencies and Commands: The role of Politicians in Water Control in a South Indian Large Scale Canal Irrigation System', in International Conference on The Political Economy of Water in South Asia: Rural and Urban Action in Interactions organised by Joint Committee on South Asia Social Science Research Council/American Council of Learned Societies and Madras Institute of Development Studies, 226–40.
- Mollinga, Peter P. 1998. *On the Waterfront: Water Distribution, Technology and Agrarian Change in a South India Canal Irrigation System*. Netherlands: Netherlands Foundation for the Advancement of Tropical Research.
- Morris, Sebastian 1996. 'Political Economy of Electric Power in India', *Economic and Political Weekly*, Vol. XXXI, No.20, 1201–10.
- Mosse, David 1997a. 'Ecological Zones and the Culture of Collective Action: The History and Social Organisation of a Tank Irrigation System in Tamil Nadu', *South Indian Studies*, No.3, 1–88.
- Mosse, David 1997b. 'The Symbolic making of a Common Property Resources: History, Ecology and Locality in a Tank-Irrigated Landscape in South India', *Development and Change*, Vol.25, No.3, 467–504.
- Mosse, David 1999. 'Colonial and Contemporary Ideologies of "Community Management": the case of Tank Irrigation Development in South India', *Modern Asian Studies*, Vol.33, No.2, 303–38.



- Palanisami, K. 1984. *Irrigation Water Management: The Determinants of Canal Water Distribution in India – A Micro Analysis*. New Delhi: Agricole Publishing Academy.
- Palanisami, K. 1994. 'River Pumping in Bhavani Basin – Economics and Constraints', *Sharing Common Water Resources*, 46–56. Madras: Madras Institute of Development Studies.
- Pradhan, Rajendra and Pradhan, Ujjwal 2000. 'Negotiating Access and rights: Disputes over Rights to an Irrigation Water Source in Nepal', in *Negotiating Water Rights*, ed. B.R. Burns and R.S. Meinzen-Dick. New Delhi: Vistaar Publications.
- Rajagopal, A. 1991. *Water Management in Agriculture with special reference to Irrigation Institutions*, (unpublished Ph.D thesis). Trivandrum: Centre for Development Studies.
- Rajagopal, A. and Anbazhagan, P. 1989. 'Problems of Pumpset-Farmers in Tamil Nadu', *Economic and Political Weekly*, Vol.XXIV, No.7, 341–2.
- Rao, D.S.K. 1993. 'Ground Water Overexploitation through Borehole Technology', *Economic and Political Weekly*, Vol.XXVIII, No.52, A.129–34.
- Rao, G.R. (ed.) 1967. *Progressive Madras State*. Madras: The Hindustan Chamber of Commerce.
- Rasu, S. 1987. *Kalingaroyan Kaalvai* (in Tamil). Erode: Kongu Research Centre.
- Rathore, M.S and Mathur, R.M. 1999. 'Local Strategies for water management and Conservation: A study of Shekhawati basin, Rajasthan', in *Rethinking the Mosaic: Investigations into Local Water Management*, ed. Marcus Moench, Elisabeth Caspari and Ajaya Dixit, 261–300. Kathmandu: Nepal Water Conservation Foundation and Boulder: Institute for Social and Environmental Transition.
- Ratnagar, Shereen 1989. 'Traditional Technologies in Indian Agriculture', *Economic and Political Weekly*, Vol.XXIV, No.42, 2359–61.
- Reddy, V.R. 1990. 'Irrigation in Colonial India: A Study of Madras Presidency during 1860–1900', *Economic and Political Weekly*, Vol.XXV, No.17, 1047–54.
- Reidinger, Richard B. 1980. 'Water Management by Administrative Procedures in an Indian Irrigation System', in *Irrigation and Agricultural Development in Asia: Perspectives from the Social Sciences*, ed. E. Walter Coward, Jr, 262–88. Ithaca and London: Cornell University Press.
- Rosen, Agneta Von and Soderberg, B.O. 1983. *Agriculture in Coimbatore, Tamil Nadu, India – A Study of Socio-Economic Aspects on Technical Improvement*. Stockholm.
- Sadeque, S.Z. 2000. 'Nature's Bounty or Scarce Community: Competition and Consensus over Ground Water use in Rural Bangladesh', in *Negotiating Water Rights*, ed. B.R. Burns and R.S. Meinzen-Dick. New Delhi: Vistaar Publications.
- Saravanan, Velayutham 1998. *Local Strategies for water supply and conservation management in the Bhavani and Noyyal river basins*, Part I. Chennai: Madras Institute of Development Studies.
- Saravanan, Velayutham 1999. *Urban Drinking Water options in the Noyyal Basins: Population, Industrial Growth and Water demand for Coimbarore and Tiruppur cities: 1881–1991*. Chennai: Madras Institute of Development Studies.
- Saravanan, Velayutham and Paul Appasamy 1999. 'Historical Perspectives on Conflicts over Domestic and Industrial Supply in the Bhavani and Noyyal Basins, Tamil Nadu', in *Rethinking the Mosaic: Investigations into Local Water Management*, ed. Marcus Moench, Elisabeth Caspari and Ajaya Dixit, 161–90. Kathmandu: Nepal Water Conservation Foundation and Boulder: Institute for Social and Environmental Transition.

## WATER CONFLICTS IN TAMIL NADU

- Sutawan, Nyoman 2000. 'Negotiation of Water Allocation among Irrigators' Associations in Bali, Indonesia', in *Negotiating Water Rights*, ed. B.R. Burns and R.S. Meinzen-Dick. New Delhi: Vistaar Publications.
- Schultz, Theodore W. 1964. *Transforming Traditional Agriculture*. New Haven and London: Yale University Press.
- Sengupta, Nirmal 1985. 'Irrigation: Traditional and Modern', *Economic and Political Weekly*, Vol.XX, Nos.45, 46 and 47, 1919–38.
- Sengupta, Nirmal 1991. *Managing Common Property: Irrigation in India and Phillipines*. New Delhi: Sage Publications.
- Sengupta, Nirmal 2000. *World Commission on Dams India Country Report: Laws, Policies and Institutional Framework for Options Assessment and Decision Making*. Chennai: Madras Institute of Development Studies.
- Sharma. S.C. 1995. 'Regulation of Groundwater Development in India: Existing Provisions and Future Options', in *Groundwater Law: The Growing Debate*, ed. Marcus Moench, 6–17. Agmedabad: VIKSAT-Pacific Institute of Collaborative Groundwater Project.
- Singh, Chhatrapati 1991. *Water Rights and Principles of Water Resource Management*. New Delhi: Indian Law Institute.
- Singh, Chhatrapati 1995. 'Research Agenda for Groundwater Law in India', in *Groundwater Law: The Growing Debate*, ed. Marcus Moench, 174–80. Agmedabad: VIKSAT-Pacific Institute of Collaborative Groundwater Project.
- Sivasubramaniyan, K. 1995. *Irrigation Institutions in Two Large Multi-Village Tanks of Tamil Nadu: Structure, Functioning and Impact*. Madras: University of Madras (Unpublished Ph.D thesis).
- Sivasubramaniyan, K. 1997. 'Irrigation Institutions and Two Major System Tanks in Tamil Nadu', *Review of Development and Change*, Vol.II, No.2, 355–77.
- Sivasubramaniyam, K. 1998. 'Maintenance of Irrigation Networks under Major Tanks in Tamil Nadu' *Review of Development and Change*, Vol.III, No.2, 264–96.
- Sivasubramaniyan, K. 2000. 'Water Management under Traditional Tank Irrigation Systems: with special reference to Mamulmamas', *Review of Development and Change*, Vol.V, No.2.
- Sonachalam, K.S. 1968. *Electricity and Economic Development of Madras State*. Annamalainagar: Annamalai University.
- Spiertz, H.L. Joep 2000. 'Water Rights and Legal Pluralism: Some basics of a Legal Anthropological Approach', in *Negotiating Water Rights*, ed. B.R. Burns and R.S. Meinzen-Dick. New Delhi: Vistaar Publications.
- Swaminathan, L.P. 1989. 'Ground-Water Development and its Consequences in Coimbatore District, Tamil Nadu', *Workshop on Critical Issues in Tamil Nadu Irrigation*, held at Madras Institute of Development Studies.
- Swaminathan, L.P. and Sivanappan, R.K. 1986. *A Study on the Cost of Irrigation Water in Coimbatore District*. Water Technology Centre, Coimbatore: Tamil Nadu Agricultural University,
- Tamil Nadu Electricity Board, *Administration Report of the Tamil Nadu Electricity Board for 1976–77*. Madras: Government of Tamil Nadu.
- Vaidyanathan, A. 1978. 'Labour use in Indian Agriculture: An Analysis based on Farm Management Survey Data', in *Labour Absorption in Indian Agriculture: Some Exploratory Investigations*, ed. P.K. Bardhan, A. Vaidyanathan, Y. Alagh, G.S. Bhalla and A. Bhaduri, 33–118. Bangkok: ILO-ARTEP publications.

- Vaidyanathan, A. 1992. *Strategy for Development of Tank Irrigation*. Madras: Madras Institute of Development Studies.
- Vaidyanathan, A. 1994. *Second India Studies Revisited: Water*. Chennai: Madras Institute of Development Studies.
- Vaidyanathan, A. 1999. *Water Resource Management Institutions and Irrigation Development in India*. Oxford: Oxford University Press.
- Vander Velde, Edward J. 1980. 'Local Consequences of a Large-Scale Irrigation System in India', in *Irrigation and Agricultural Development in Asia: Perspectives from the Social Sciences*, ed. Walter Coward, Jr. Ithaca and London: Cornell University Press.
- Vani, M.S. 1992. *Role of Panchayat Institutions in Irrigation Management: Law and Policy*. New Delhi: The India Law Institute.
- Vassart, Michel 1981. *Technologies for Lifting Irrigation Water*. New Delhi.
- Wade, Robert 1975a. 'Water to the Fields: India's Changing Strategy', *South Asian Review*, Vol.8, No.4, 301–21.
- Wade, Robert 1975b. 'Administration and Distribution of Irrigation Benefits', *Economic and Political Weekly*, Vol.X, Nos.44 and 45, 1743–7.
- Wade, Robert 1978. 'Water Supply an Instrument of Agricultural Policy: A case Study', *Economic and Political Weekly*, Vol.XIII, No.12, A.9–13.
- Wade, Robert 1979a. 'Collective Responsibility in Construction and Management of Irrigation Canals: Case of Italy', *Economic and Political Weekly*, Vol.XIV, Nos.51 and 52, A-155–60.
- Wade, Robert 1979b. 'The Social Response to Irrigation: An Indian case study', *Journal of Development Studies*, Vol.XVI, No.1, 3–26.
- Wade, Robert 1980a. 'Access to the Irrigation Department: The Tail-end Problem under South Indian Irrigation Canals', *Indian Journal of Public Administration*, Vol.26, No.2, 359–78.
- Wade, Robert 1980b. 'On Substituting Management for Water in Canal Irrigation: A South Indian Case', *Economic and Political Weekly*, Vol.XV, No.51, A-147–60.
- Wade, Robert 1982a. 'The System of Administrative and Political Corruption: Canal Irrigation in South India', *Journal of Development Studies*, Vol.18, No.3, 287–328.
- Wade, Robert 1982b. 'Corruption: Where Does the Money go?', *Economic and Political Weekly*, Vol.XVII, No.40, 1606.
- Wade, Robert 1982c. 'Group Action for Irrigation', *Economic and Political Weekly*, Vol.XVII, No.39, A.103–7.
- Wade, Robert 1985. 'The Market for Public Office: Why the Indian State is not Better at Development', *World Development*, Vol.13, No.4, 467–97.
- Wade, Robert 1987. *Village Republics: Economic Conditions for Collective Action in South India*. Cambridge: Cambridge University Press.
- Wade, Robert and Chambers, Robert 1980. 'Managing the Main System: Canal Irrigation's Blind Spot', *Economic and Political Weekly*, Vol.XV, No.39, A-107–12.
- World Bank 1991. *India Irrigation Sector Review*, 2 volumes.

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## APPENDIX I

Cropping-pattern in Bhavani, Erode, Gobichettipalayam and Dharapuram taluks of Coimbatore district in 1971 (irrigated crops only).

Crops	Bhavani		Erode		Gobichettipalayam		Dharapuram	
	Acres	%*	Acres	%*	Acres	%*	Acres	%*
Rice	9,916.26	35.72	26,868.51	50.89	21,546.16	47.53	11,032.62	25.58
Cholam	1,369.28	4.93	4,668.54	8.84	2,239.71	4.94	8292.77	19.23
Cumbu	3,075.36	11.08	1,459.85	2.77	3,284.32	7.24	2,074.65	4.81
Ragi& other cereals	3,692.06	13.30	1,673.34	3.17	3,642.47	8.03	5,612.62	13.01
Pulses	89.49	0.32	82.47	0.16	100.53	0.22	1,633.09	3.79
<i>Total food grains</i>	<i>18,142.45</i>	<i>65.36</i>	<i>34,752.71</i>	<i>65.83</i>	<i>30813.19</i>	<i>67.97</i>	<i>28,645.75</i>	<i>66.43</i>
Condiments	1,383.97	4.99	3,004.17	5.69	2,687.39	5.93	1,371.67	3.18
Orchards	72.12	0.26	689.94	1.31	339.91	0.75	300.84	0.69
Vegetables	871.87	3.14	227.80	0.43	305.06	0.67	262.90	0.61
Cotton	958.90	3.45	5,852.91	11.09	3,447.47	7.60	4,934.06	11.44
Sugarcane	3,964.60	14.28	2,320.70	4.39	3,600.23	7.94	1,454.33	3.37
Groundnut	1,328.92	4.79	3,768.87	7.14	1,847.37	4.08	3,376.90	7.83
Cocunut	105.65	0.38	479.96	0.91	148.55	0.33	262.24	0.61
Gingelly	228.94	0.82	720.18	1.36	11.46	0.23	377.19	0.87
Other oilseeds	88.83	0.32	106.47	0.20	62.51	0.14	60.80	0.14
Coffee	–	–	0.12		0.11		0.14	
Tea	0.55	0.01			0.25		0.06	
Others	611.55	2.20	866.34	1.64	2,069.59	4.57	2,077.91	4.82
<i>Total Non- food crops</i>	<i>9,615.90</i>	<i>34.64</i>	<i>18,037.46</i>	<i>34.17</i>	<i>14,519.90</i>	<i>32.03</i>	<i>14,479.04</i>	<i>33.57</i>
<b>Gross Cropped Area</b>	<b>27,758.35</b>	<b>100</b>	<b>52,790.17</b>	<b>100</b>	<b>45,333.09</b>	<b>100</b>	<b>43,124.79</b>	<b>100</b>

\* Percentage of total cropped area

Source: Agricultural Census 1970–71, Coimbatore District: District, Taluk and Panchayat Union Tables, Government of Tamil Nadu, 1976, 36–37, 122–23, 160–61 and 190–191.

## APPENDIX II

Petitions from the Lower-reach Farmers and the Nature of Problems in LBP channel.

<b>Sl No.</b>	<b>Date of Petition</b>	<b>Name of Village</b>	<b>Name of Distributory</b>	<b>Nature of Problem</b>
1	9/1/1956	Thadapalligramam	Tailend at mile 23/0 of LBP Main Canal	Insufficient water supply
2	22/12/1955	Lakkampatti	Tailend of branch distributory at mile 30/4 of main canal	Defective distribution under the tail dam
3	11/10/1955	—	Tailend of branch distributory at mile 3/4/600 of kugalur distributory	Trouble in the internal distribution of water among the ryots
4	15/12/1955	Nagadevam palayam	Tailend of distributory at mile 35/6 of main canal	Insufficient supply due to cultivation in the upper reaches
5	—			
6	28/11/1955 9/1/1956	Vairamangalam	Tailend of right side pallel channel of Mettupalayam distributory at mile 51/7 of main canal	—
7	23/2/1956	Vairamangalam	do	Large scale paddy cultivation
8	24/8/1955	Surampatti	Tailend of Erode distributory at mile 56/4 of main canal	Field bothies not excavated
9	—	—	Tailend of branch distributory at mile 5/4/480 of Erode distributory	Bunding by upper ryots
10	6/10/1955	Muthampalayam	Tailend branch distributory at mile 1/0 of Unjalur distributory, at mile 63/0 of main canal	—
11	—	Ryots association of LBP at Erode	Muthampalayam branch distributory at mile 1/0	Non-cooperation by ryots
12	2/2/1956	Letter from Tahsildar, Erode	Tailend of branch distributory at 5/0/200 of Erode distributory	Cross bunding by upper ryots

## WATER CONFLICTS IN TAMIL NADU

13	11/1/1956	Kanagapuram	Branch at 1/0/49 right of Unjalur distributory	Non-cooperation by ryots
14	—	Thuyampundurairi	Branch at 3/7/390 of Unjalur distributory	Scarcity of water
15	16/1/1956	do	do	do
16	7/10/1955	Avalpundurairi	Branch at 4/3/570 of Unjalur distributory	do
17	29/1/1956	Erode	Sub-branch at 1/2/70 LBP of 5/0/30 branch of Unjalur distributory	Cross bunding by upper ryots
18	25/1/1956	Pudur	Tailend of branch distributory at mile 5/0/30 of Unjalur distributory	Large scale paddy cultivation of upper reach
19	16/1/1956	Ryots	Tailend branch of distributory at mile 8/2 & 9/0 of Unjalur distributory	Throttling the sluices in the upper reaches
20	27/12/1955	S.D.C's Letter	Branch distributory at mile 1/6/160 of distributory at mile 70/1/145	—
21	24/10/1955	Palayamkottai	Sub-branch at 2/1/66 of the branch at 0/8/42 of Chennasamudram distributory	Not following the time schedule by the upper ryots
22	30/9/1955	Velampalayam	Tailend of the sub-branch at 0/3/70 of the branch at 1/5 of Chennasamudram distributory	Insufficient water supply
23	22/11/1955	do	do	do
24	15/12/1955	Elamathur	Sub-branch at 2/5/40 left to kagam branch of Chennasamudram distributory	do
25	15/12/1955	Sivagiri	Sub-branch at 0/2/380 of the branch at 5/3/360 of Chennasamudram distributory	do
26	18/1/1956	Kollenkovil	Sub-branch at 0/3/20 of the branch at 5/7 of Chennasamudram distributory	Unauthorised cuts and cross bunding
27	14/10/1955	K.R.Nallasivam, MLA	Branch at mile 9/7 of Chennasamudram distributory	
28	27/10/1955	Ramasamy Goundar	do	Insufficient water supply

## VELAYUTHAM SARAVANAN

29	11/1/1956	Ryots of LBP Association, Erode	Branch at 10/4 of Chennasamudram distributory	Existence of cross walls
30	5/11/1955	Ichipalayam	13/2 branch of Chennasamudram distributory	Insufficient water supply
31	29/1/1956	do	do	do
32	—	From Ryots	Distributory at mile 76/5 & 78/7 of main canal	Non-observation of time schedule
33	13/10/1955	K.R.Nallasivam, MLA	Distributory at mile 78/6 & 78/7 of main canal	Non-cooperation among the ryots
34	12/10/1955	Justice Ramasamy Goundar	Tailend dam at 1/7/300 of branch at 0/3/500 at Anjur distributory	Insufficient water supply
35	12/10/1955	do	Branches at 0/3/500, 1/1/60 and 2/0/200 of Anjur distributory	do

Source: G.O.No.2049 Mis, Public Works Department, 30 April 1956, TNSA.